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American Perfumer

VOL. 76, NO. 4 April, 1961

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A composite of scientific literature covering the research activities in essential oils and synthetic aromatics during 1960.

"Progrès obtenu sur les articles de parfumerie"
Une documentation scientifique couvrant les recherches sur les huiles essentielles et sur les aromatiques synthétiques pendant l'année 1960.

"Progreso en Materiales de Perfumería"
Un compendio de Literatura Científica que cubre las actividades e investigaciones sobre aceites y aromáticos sintéticos, esenciales, durante el año de 1960.

Fortschritte in Parfumerie Materialien
Eine Zusammenstellung der wissenschaftlichen Literatur über die Forschungstätigkeit auf dem Gebiet der ätherischen Ole und synthetischen Aromaten im Jahre 1960.

Application of Acid-Base Theory to Product Formulation by Robert J. Gerraughty 31

Stability of cosmetic formulations can be improved by applying some basic theories of pH and buffer systems.

"Application de la théorie des acides de base sur la préparation de la formule des produits"
La stabilité des formules cosmétiques peut etre améliorée en employant quelques théories de base de pH ainsi que les systèmes "Tampon".

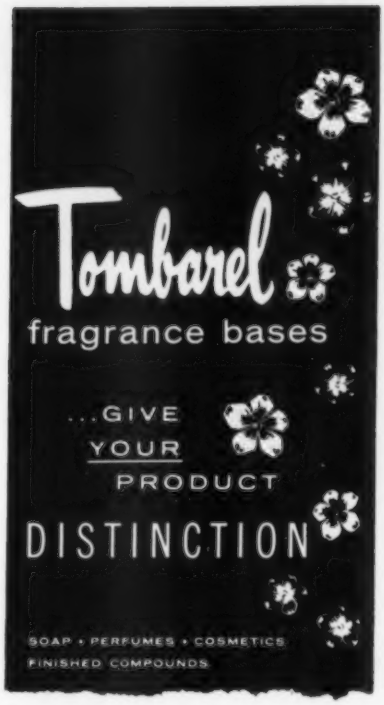
"Aplicación de la Teoría Acido-Base a la Formación de Productos"
Se puede aumentar la estabilidad en fórmulas para cosméticos aplicando algunas teorías básicas de pH y sistemas de estabilización.

Anwendung der Säure-Base Theorie auf die Produkt-Formeln
Die Stabilität der kosmetischen Formeln kann durch die Anwendung einiger grundlegenden Theorien bezüglich pH und Puffersysteme verbessert werden.

The effect of Perfumery Chemicals on the Insecticidal Efficiency of Pyrethrum . . . . . by J. Pickthall, F. G. Sarel Whitfield, & A. Howard Baker 34

Thirteen perfumery compounds, commonly used in insect control formulations, containing pyrethrins were tested biologically for antagonism to pyrethrins.

"L'effet des produits chimiques de parfumerie aur l'efficacité insecticide de la pyrèthre"
Treize composés de parfumerie, ordinairement employés dans les formules contenant de la pyrèthre pour combattre les insectes, qui



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ont été biologiquement essayés quant à leur propriété réfractaire à la pyrèthre.

"Los efectos de Productos Químicos de perfumería en la Eficiencia Insecticida del (Pyrethrum)"
Fueron puestos a prueba, para estudiar su antagonismo a las piretrinas, trece compuestos de perfumería que contienen piretrinas, comunmente usados en fórmulas para control de insectos.

Der einfluss von parfumerie-Chemikalien auf die Insekten vertilgende Wirkung von Pyrethrum
Dreizehn Pyrethrine enthaltende Parfumerie-Mischungen, die bei Insekten-Vertilgungsmitteln allgemein verwendet werden, wurden biologisch auf ihre Widerstandsfähigkeit gegen Pyrethrine geprüft.

Selling in the Sixties.....***by Herbert H. Lank*** **39**

As our economy is moving forward and changing, selling, too, must change to keep pace. Selling is no longer just "order taking" but a science.

"Les ventes en 1960"
Etant donné que notre économie progresse, change, les ventes aussi doivent suirre ce progrès. Les ventes ne sont plus un simple "enregistrement des commandes" mais une science.

"Vendiendo en los Sesentas"
Ya que aumenta y cambia nuestra economía, los sistemas de ventas, también deben cambiar al mismo tiempo. El vender no es actualmente el "tomar una órden", es una ciencia.

Verkaufstätigkeit in den sechziger Jahren
Bei dem Vorwärtsschreiten und der Anderung unseres Wirtschaftswesens muss sich auch die Verkaufstätigkeit ändern, um Schritt zu halten. Verkaufen bedeutet nicht mehr nur die "Entgegennahme von Aufträgen", sondern hat sich zu einer Wissenschaft entwickelt.

Fragrant Flowers and Leaves.....***Edward S. Maurer*** **43**

Author discusses the Apocynaceae (The Dog-bane or Periwinkle Family) which appear to offer nuances of a genre not yet familiar to perfumers.

"Les fleurs et les feuilles parfumées"
L'auteur parle de l'apocyn (famille de la pervenche) qui semble offrir des nuances d'un genre qui n'est pas encore très connu des parfumeurs.

"Flores y Hojas Fragantes"
El autor discute la "Apocynaceae" (De la famila "pervinca") la cual parece ofrecer matices de un género aún no familiar para los fabricantes de perfumes.

Duftende Blumen und Blätter
Der Author bespricht die Apocynaceae (die Apocynum—oder Immergrün-Famile), die eine Art Nuancen zu bieten scheinen, mit der die Parfum-Hersteller bis jetzt noch nicht vertraut sind.

Lanolin Plus—a company profile.....***by Jill Jessee*** **50**

Author gives a bird's eye view of this firm from the laboratory, through management to marketing and sales.

"Lanolin plus—un apercu de la compagnie"
L'auteur donne un apercu de cette compagnie en passant du laboratoire à la direction, au marketing et aux ventes.

"Lanolin Plus—perfil de una compañía"
El autor nos brinda un estudio a vuelo de pájaro de esta firma, desde el laboratorio, a través de su administración, hasta el mercado y las ventas.

Lanolin Plus—ein Firmenbild
Die Authorin gibt ein übersichtliches Bild dieser Firma—vom Laboratorium über die Leitung bis zum Vertrieb und Verkauf.

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300-400 mμ (1 cm cell)	0.18

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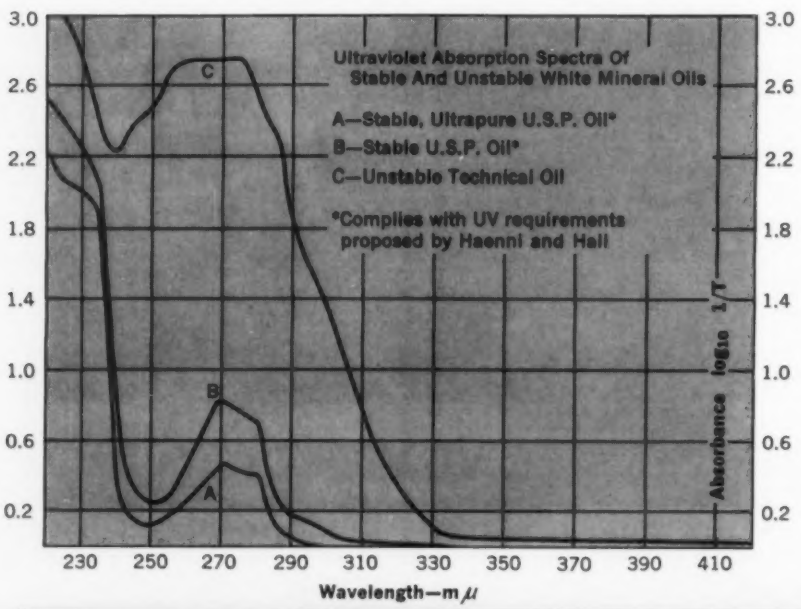

Consult us for further details and technical advice on your specific problem.

The information given here was taken from an article in the February, 1961, "American Perfumer," which discusses recent technical advances and gives Waterman composition analyses, correlation indices and other detailed data on typical white oils. Reprints of the article are available upon request.

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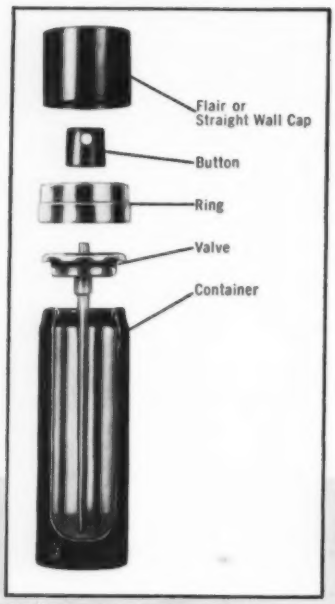

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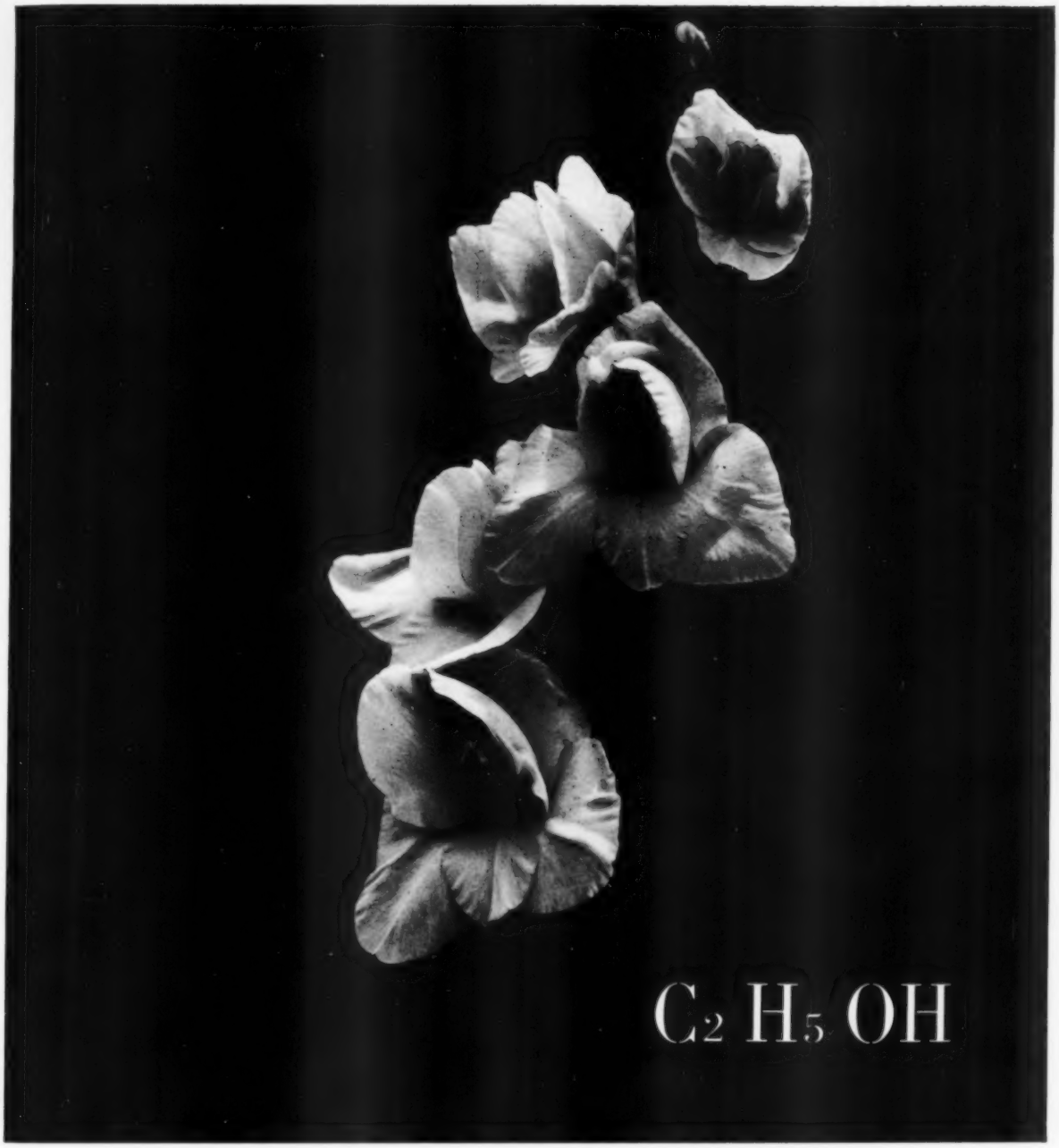

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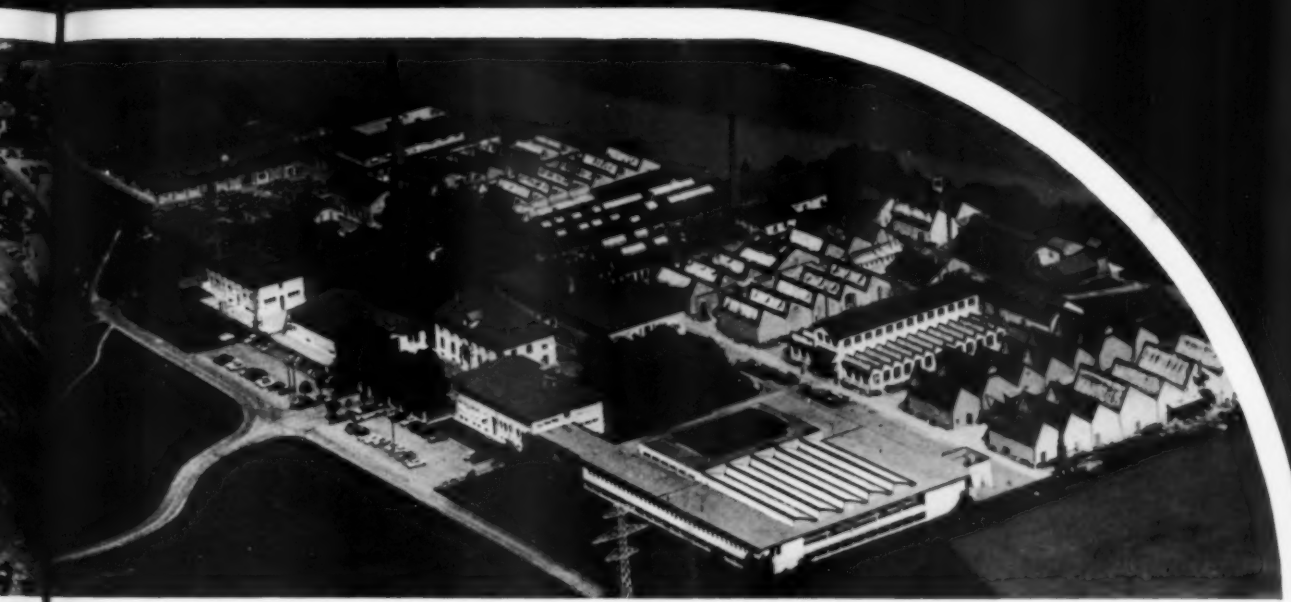

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REACTIONS

Our credits mixed

In the February issue of AMERICAN PERFUMER we inadvertently omitted a credit to the *Canadian Journal of Pharmacy* from which a major portion of Mervyn J. Huston's article, "A Warburg Flask for Respiration Studies with Tissue Suspended in Oxygen" was reprinted. Also we incorrectly credited the same Journal for the article on "New Technology of White Mineral Oils by Arthur J. Franks, Pennsylvania Refining Co. Mr. Franks article was not reprinted, but was an exclusive first with AMERICAN PERFUMER.

Oxygen absorption by skin

I am glad to see a revival of interest in oxygen absorption by the skin in the THE AMERICAN PERFUMER (76:46-48, 1961). There is still much to be learned by this approach to the study of the skin.

While working on the oxygen absorption of rat skin many years ago, I found the slicing into thin sections to be quite tedious. I believed at the time that the slicing (which required some minutes to perform) subjected the tissue to such abuse as might influence the total absorption. However, I was not able to prove that it did, or did not. Inasmuch as all skin samples were treated alike, I was obligated to assume that true relative results were obtained.

In Warburg's book, "The Metabolism of Tumors" (p 80, Constable & Co., 1930), the limiting thickness of a tissue for use in pure oxygen is given as 0.47 mm. Although I made repeated determinations, I found no difference in oxygen absorption whether I sliced the skin into thin sections or whether I used an unsliced piece measuring about 8 x 8 mm. The skin of adult male rats can attain a thickness of as much as 3 mm on the back. These observations were never published nor am I aware that they have been confirmed by another investigator.

You will recall that in THE AMERICAN PERFUMER (53:134-7, 1949) I published a review of the gas exchange of the skin. In that review I pointed out that the lungs are simply a mechanical means of oxygenating the blood. Any comparison of the total absorption by the skin from the air and the total absorption by the lungs is academic and irrelevant.

Peter Flesch (*Journal Soc. Cosmetic Chemists* XII, 107-113, 1960) mentions the oxygen absorption by the skin only briefly but he implies that the oxygen absorption by the skin is of no importance because it is only 1.5 per cent of the total pulmonary uptake. Is it to be assumed that if the oxygen absorption by any tissue of the body, say the thyroid gland, is only a small proportion of the total pulmonary uptake, it is therefore negligible?

I know of no published work demonstrating one way or the other the importance of the absorption of oxygen from the air by the skin. Does it occur only by virtue of the fact that the skin is permeable to oxygen and is surrounded by it at all times and is it purely adventitious? We do not know. My intuitive belief is that such oxygen absorption is of importance to skin health.

Sincerely,
Philip D. Adams, Ph.D.
The Andrew Jergens Company
Cincinnati, Ohio

Japanese Society uses article from AP

Thank you for your letter of January 13, wherein you extended reprint privileges to Dr. Koichi Iinoya and the Society of Chemical Engineers, Japan, for the Japanese translation of the original manuscript of the paper which was previously published as, "Flow Properties of Dry Particulates," in the September 1960 issue of AMERICAN PERFUMER.

A copy of the journal, in which the Japanese translation appears, *Chemical Engineering, Japan*, Vol. 25, No. 2 (February 1961), is enclosed. Kindly note that AMERICAN PERFUMER has been credited with the first publication from the original manuscript.

Thank you again for permission to republish the original manuscript of the article which appeared in your magazine.

E. J. Crosby, Ass't. Prof.
Dept. of Chemical Engineering
The University of Wisconsin
Madison, Wis.

We are always happy to cooperate in the matter of giving reprint permission to other publications. Of course, in this case, there is certainly no exception; but we cannot but help wishing we either knew Japanese, or that there was a universal language. It would make communication so much faster.—Editor

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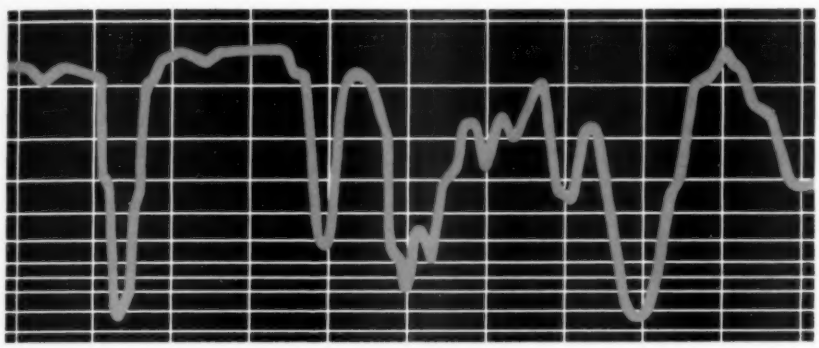

In human identification a fingerprint is regarded as an infallible characteristic of the individual. In chemical analysis a substance is characterized just as unmistakably by its spectrum. The use of spectroscopy as a modern means of quality control serves as a check on manufacturing and thus guarantees uniform quality. Spectroscopy has in addition become an indispensable tool in our physico-chemical research laboratories for both research and development.

We have published a booklet entitled "Absorption Spectroscopy", and shall be pleased to place it at the disposal of interested parties upon request.

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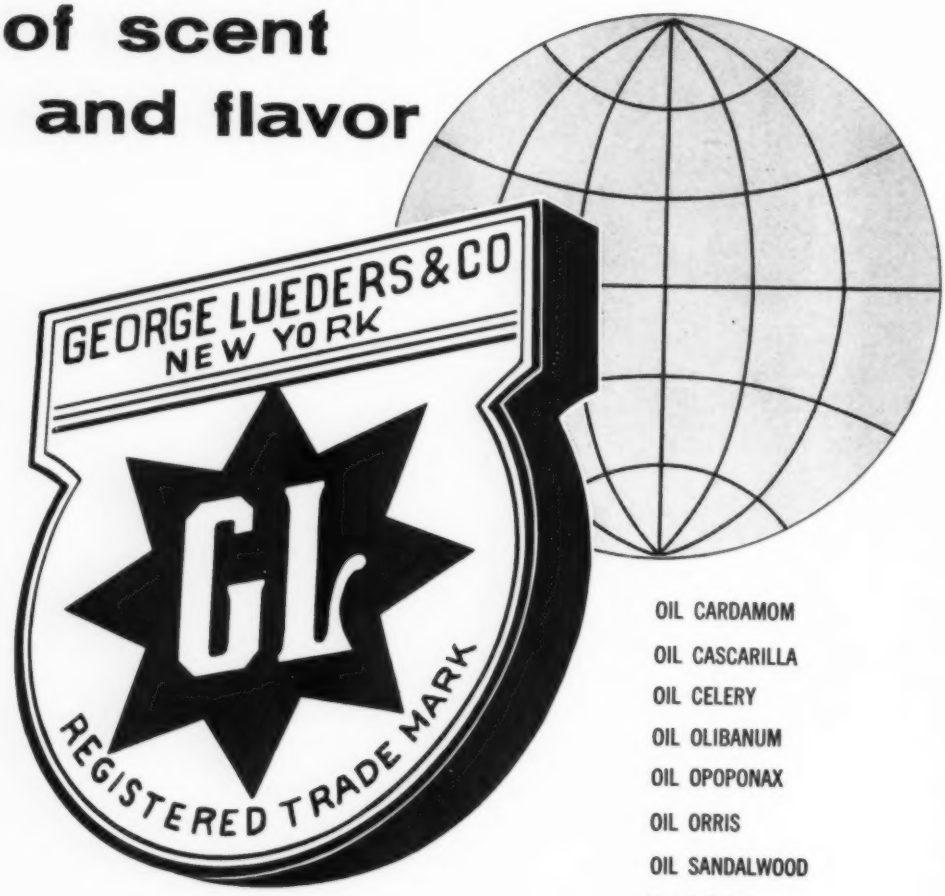

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Notes

A very receptive group of seniors was found at the University of Alberta (Edmonton) college of pharmacy when the writer discussed opportunities in the cosmetic industry. . . . . A chemist from India, now in England—specialty is fixed oils and fat chemistry—is looking for placement in product development. . . . .

Fatty acids or alcohols reacted with β-propiolactone, form good emulsifying agents (U. S. Pat. 2,962,390). . . . . Women are more concerned with getting the right color of nail polish than the brand according to the O-I Home Makers Guild survey—they also prefer regular to frosted polish. . . . . A neighbor an (engineer) tells me one of the large auto companies let out 10,000 men, age around 60 years, on partial pension, replacing them with younger, less expensive people. Now do you wonder why the Unions get in?

Well, two volumes of four of the revision of my book, *The Chemistry and Manufacture of Cosmetics*, is in the publisher's hands, the balance to be delivered this summer. What an ordeal! Hope it is as useful as readers expect it to be. . . . . However, my *International Encyclopedia of Cosmetic Material Trade Names* will have to wait until the other revision is finished. . . . . Wonder why the name of Paolo Feminis didn't get into the discussion at Santa Maria Maggiore during the celebration of the 250th anniversary of the discovery of Eau de Cologne? He is reputed to be the first creator of this product according to our worthy Italian trade paper; *Rivista Italiana*.

Revlon in S. Africa; Beauty Counselors and Avon (Kavon) in Germany; Unilever in Brazil; Biotherm now in U.S.A.; Colgate in Jamaica—the world goes around and around. . . . . This is being written on the eve of my departure for the Paris meeting of the I.F.S.C.C. Comite de Direction. Hope to renew some more friendships while abroad.

Lucky breaks

Under this heading our British contemporary, Editor of the *Manufacturing Chemist* lists among the lucky "accidents": the discovery of Saccharin by Fahlberg; Sucaryl was also accidentally found; the incident leading to safety glass by Benedictus; Nobel's discovery of blasting gelatin; Goodyear's discovery in 1860 of rubber vulcanization, and so on.

All of us if honest, could list a similar group within our own research experience. As an example, there is little doubt that present liquid make-up was thought up from the use of leg make-up.

Household detergents as shampoos

Detergents should not be used as a hair shampoo, according to a staff consultant of the American Medical Association.

Joseph B. Jerome, of the A.M.A. Committee on Cosmetics, said in the March 11 *A.M.A. Journal* that detergents are formulated for heavier cleaning duty than washing hair.

"Thus, while they may fall within the manufacturing tolerances they are likely to contain caustic ingredients which are irritating to the more sensitive areas of the skin," he said. "In using such products, one must always consider the possible damage not only to the hair and scalp but also to the eyes.

"With this in mind the use of commercial detergents for shampoos should be condemned. A large number of available shampoos are blander and, therefore, to be preferred."

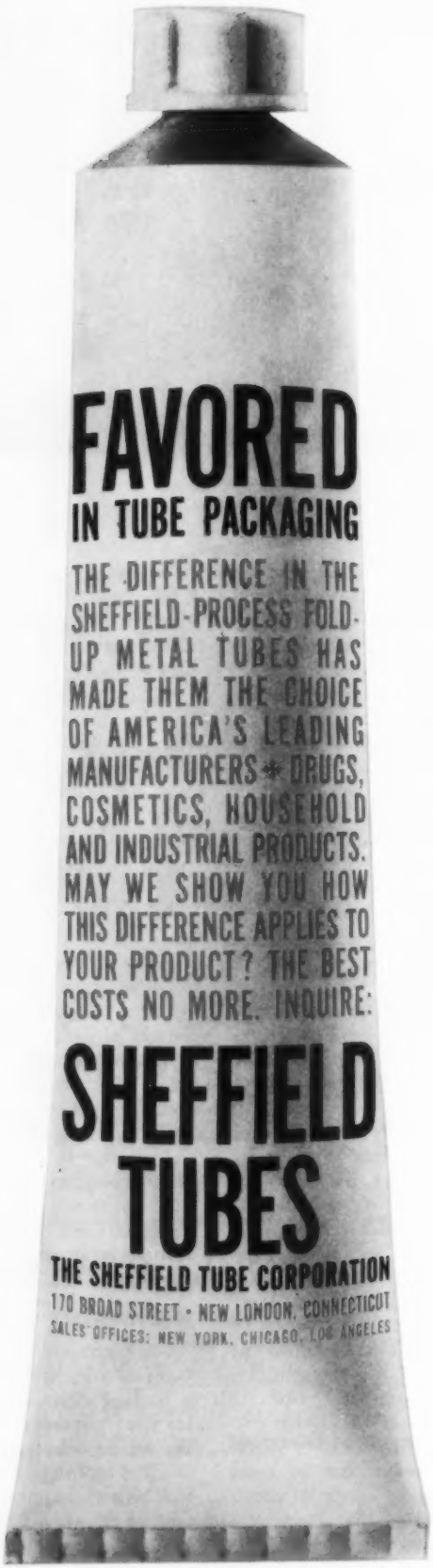
These remarks were addressed to a Connecticut physician who found mothers using these detergents as shampoos.

Indeed this writer has seen references suggesting the use of household detergents, dry or liquid, as shampoos and bubble baths in consumer literature and felt that someone was off the beam.

New ointment base

An ointment base has been developed which has been tested by a leading dermatologist at a well-known university, and we quote the report concerning this product.

"This ointment base, prepared by consultants, was tested in our laboratory independently by two dermatologic research physicians in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several dozen cases. The ointment was found to have outstanding properties and was thought to have applicability in the following three areas:

"1. In *clinical cases* with widespread dermatoses (psoriasis, exfoliative dermatitis) during and after treatment, in order to restore the normal suppleness and water-binding ability of the skin surface. Frequently, the prolonged local treatment needed in these cases, leads to excessive dryness of the skin. The best way to combat this dryness is by means of a so-called hydration routine, during which the patient avoids rubbing himself completely dry after bathing and instead applies a thin film of ointment on the still moist skin.

"The test base is excellent for this purpose, inasmuch as it is much better tolerated, much more efficient than preparations heretofore used to obtain a hydrating effect. It was invariably preferred by the patients, who asked for it whenever it was replaced with some other preparation.

"The main advantages of the test base were its completely non-irritating and non-sensitizing nature, its lack of greasiness (after the rapid disappearance of an early stage of greasy feeling) and the pleasant "soothing" effect it imparted to the skin. Furthermore, it did not give rise to any feeling of unpleasant warmth which often adds to the irritation and causes much complaint. The conditions were rapidly corrected, much more so than with other standard preparations.

"2. For *cosmetic purposes,* the test base is excellent for eliminating symptoms connected with dryness of the skin. The ointment is well absorbed by the superficial horny layer, alleviates "winter-itch" with greater ease and more permanently than other ointment bases and was well tolerated by all patients. Closely related is the condition of dryness due to detergents ("dishpan hands") which also responds well to the test base.

"3. As an *ointment base* for the incorporation of medicaments, the test base has the virtue of being well miscible with aqueous as well as lipid solutions, being non-reactive and non-allergenic and of not causing any primary irritation".

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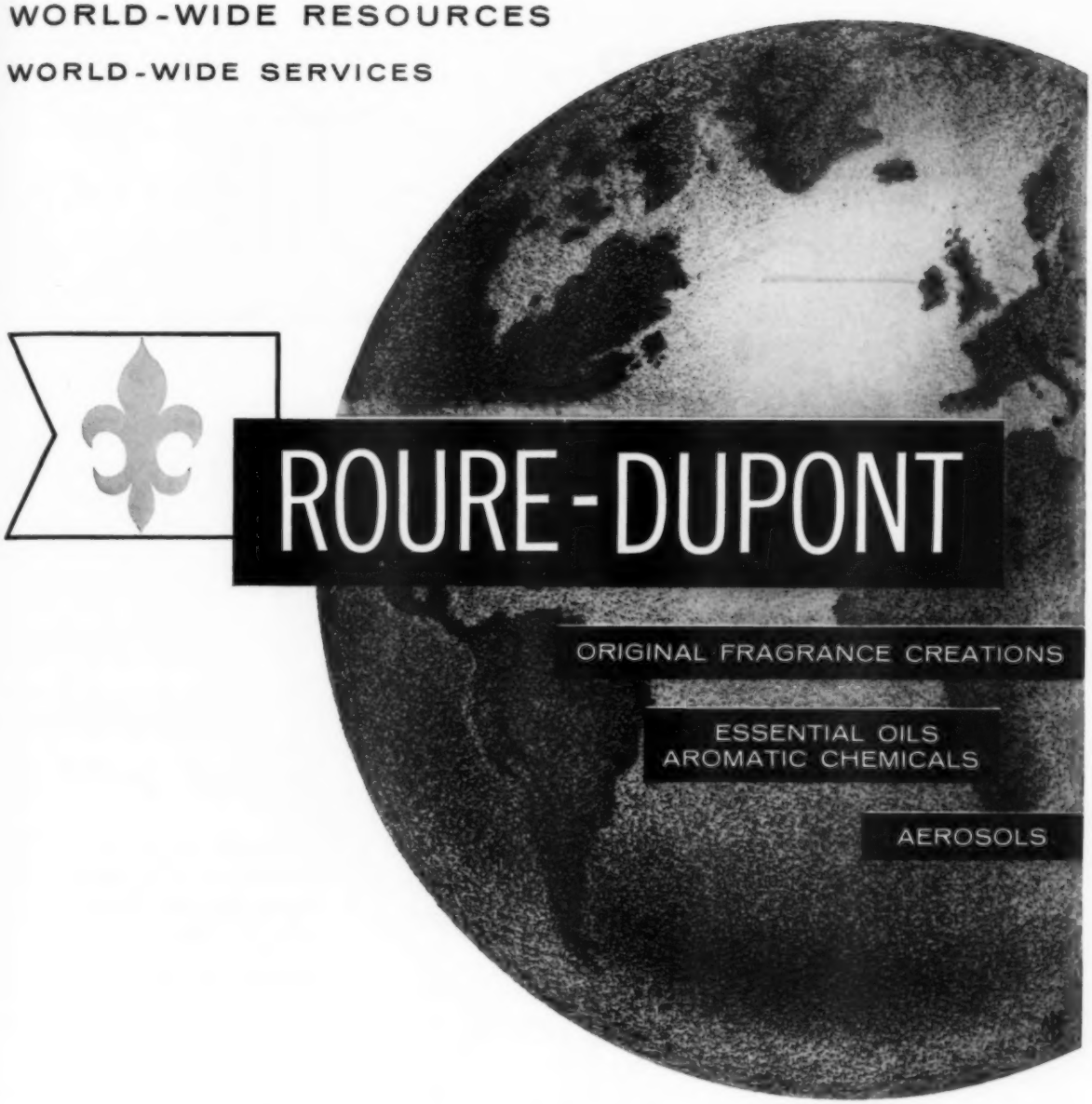

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Perfume industry made big strides in research during 1960

by Paul Z. Bedoukian
Author of "Perfumery Synthetics and Isolates"

The scope of scientific research in 1960 is clearly indicated by the amount of scientific literature published during the year. In the chemical sciences alone, the Chemical Abstracts, which serve as the main source for this review, contained 26,028 pages, as compared with 23,114 pages in 1959, and 21,258 pages in 1958. Just ten years ago, in 1950, there were only 11,184 pages, less than half the number in the 1960 Abstracts.

The accelerated pace of scientific studies and developments presages changes which will be much more drastic than those brought about by the industrial revolution of the past century. Even our food habits are gradually being altered, so that before long much of our food will be pre-cooked and ready to serve with only a slight effort on the part of the housewife.

In this rapidly changing way of life, the chemical sciences are playing a major role. Advances in organic chemistry are frequently responsible for developments affecting our industry. The ever increasing demand for perfumery and flavoring materials, caused partly by rising standards throughout the world and partly by rapidly growing populations, can be met only by an increased supply of synthetic aromatics since available lands for the culture of essential oil bearing plants are becoming scarcer. Large consumers of aromatic materials are therefore trying to depend less on essential oils of natural origin.

Nevertheless, essential oils are still indispensable in many instances because their fine odor qualities have not yet been duplicated by synthetics. The duplication of essential oils is still beyond our reach, but the problem is certainly not an unsolvable one. Efforts are being made to improve the yield of oil from essential oil bearing plants. On the other hand, noteworthy advances have been made in the development of synthetic aromatics.

Looking over the year's developments in our field, one is struck by the valuable contributions made to our knowledge of the chemistry of sesquiterpenes. This is an area which is exceedingly important to the art of perfumery but about which comparatively little is known.

A whole range of terpene materials is now being manufactured from pinene which is readily available, and at least one purely synthetic aromatic has appeared which reproduces the odor of sandalwood with remarkable fidelity.

In writing this annual review, we have again of necessity left out much material, mostly of academic interest in the terpene field, in order to keep the article within the scope of this publication. The latest advances in the chemistry of terpenes, sesquiterpenes and related materials are covered in a number of excellent review articles.

Studies in the past on the nature of odor have not resulted in any appreciable progress toward the understanding of this most perplexing phenomenon.

Nevertheless, any hope of an eventual solution of this problem depends on continued research and it is always interesting to note new efforts in this direction.

Stereochemical specificity of the human olfactory receptors was tested using methyl-4-carbomethoxypimelate and methyl-4-carbomethoxy-4-methylpimelate (1). The experiments are detailed in a lengthy article. Under the title of "What is Smell?," a recent article discusses the physiology of the olfactory organs and the mechanism of odor reception. The article also sets forth some theories on the mechanism of the perception of odor (2). Among the practical applications of odor engineering in various industries which were discussed in an interesting article, are the introduction of pleasant odors to improve working conditions, the elimination of objectionable odors, and the use of obnoxious odors to serve as alarm systems (3).

Our present knowledge of the relationship of chemical structure and odor was summed up in a recent publication (4).

Under the title of "Perfumery Documentary," the AMERICAN PERFUMER devoted its entire June, 1960 issue to perfumery (5). This most informative issue contained articles of interest to the perfumer. These included: *Notes on Toilet Soap Perfumery; The Qualified Consumer Panel for Fragrance Evaluation; Space Deodorants . . . Opportunities Ahead; Adapting a Fragrance Theme to a Line; Lotion and Cream Sachet; Perfuming of Household Specialties; Perfumes and Plastics; Some Thoughts on Perfuming of Cosmetics; The Rarer Essential Oils and their Use in Perfumery; Perfume the French Way; Pharmacological Properties of some Essential Oils; History of Perfumes; Some Newer Synthetic Chemicals; Development of the Grasse Aromatic Industry.*

Two articles dealt with lilac perfume and its composition (5a)(6).

The use of some of the synthetic terpene alcohols derived from pinene was discussed by another writer (7). The nature of the odor of algae and its possibilities in perfumery was indicated in a recent article in a French publication (8).

The stability and persistence of perfumery materials were determined by exposing a piece of cloth soaked in perfume to a turbulent stream of air at 20°C.(9).

Two French patents describe methods of obtaining solid or waxy perfumes by the incorporation of perfume oil into a suitable medium (10)(11).

Studies on the extraction of rose oil and investigations of its properties and composition are being continued. In a fraction of rose oil, the following substances were identified: benzaldehyde, phenyl ethyl alcohol, citronellol, linalool, enanthaldehyde, methylheptenone, 1-hexanol, and an oxide which was shown to be 3-methyl-2-(3-methyl-2-butenyl) tetrahydrofuran (12). This report has been confirmed by others (13). The hydrocarbon 10-eicosene was identified in the stearoptene of rose oil (14).

In addition to the previously known aldehydic constituents, citral, nonyl aldehyde and carvone, paper partition chromatography showed the presence of acetaldehyde, propionaldehyde, valeraldehyde, p-hydroxy benzaldehyde, cinnamaldehyde, and phenylacetaldehyde (15)(16). By a similar technique, nonyl, methyl, ethyl and phenyl ethyl alcohols were detected, and probably geraniol, nerol, linalool and citronellol. Among the acids, acetic and valeric, in both combined and free states, were shown to exist in rose oil (17). Experiments have indicated that it is self-heating of the petals and not the time of harvesting that adversely affects the yield and organoleptic properties of the oil (18).

Gas-liquid partition chromatography of jasmine oil has shown the presence of benzyl alcohol, linalool, benzyl acetate and benzyl benzoate. There appeared to be no linalyl acetate in jasmine oil (19).

Zdravetz is an extremely interesting oil and valuable for use in perfume compositions. A careful study appeared some time ago which gave its composition as 52% germacrone, 7% terpenes, 11% sesquiterpenes, 10% sesquiterpenols, 17% sesquiterpenones, and the balance resins and polymers (20). Germacrone is a novel monocyclic ketone of the structure I (20a), shown on page 27. Other sesquiterpenes- occurring in this oil were also investigated (20b).

New techniques in the extraction of essential oils

In the past, the distillation or extraction of essential oils has been more or less an art, but in recent years engineering principles have been increasingly applied to this art to improve the yields and quality of the oils.

A recent patent describes the extraction of essential oils from flowers by applying supersonic vibrations

to the flowers placed in a solvent. The apparatus described is claimed to be useful for the preparation of concretes and resinoids (20c). Continuous extraction of rose petals with petroleum ether was reported to give better quality and higher yields of oils than the conventional steam distillation process (20d).

Large quantities of coriander oil are produced in the Soviet Union, and studies on improved methods of production of this oil have been published. In a recent study, over ninety per cent of the oil content of the seeds was recovered by extracting the seeds with a solvent and then separating the fatty oil from the essential oil by steam distillation in a suitable apparatus (20e).

A Soviet patent discloses a method of extracting rose oil by trapping the steam distillate in a suitable solvent (20f).

Essential oils can be saponified with ammonia and the salt formed decomposed by heat to liberate ammonia which can be recycled to treat a fresh batch of oil, according to a Spanish patent (20g).

Application of various analytical procedures to the perfume industry

The analytical chemist is making full use of recently developed techniques in the examination of perfumery materials. As more sensitive methods are devised, it becomes possible to evaluate the purity of materials with a much greater degree of exactitude. However, it should be borne in mind that even the most sensitive analytical methods we have are in many cases less discriminating than the trained nose of the perfumer. It is no wonder that the perfumer's nose is still the final arbiter for the acceptability of a material in a given fragrance.

Of the newer instrumental methods of analysis, the spectral methods (ultraviolet, visible, infrared) and vapor-phase chromatography are now commonly used. Mass spectrometry and nuclear magnetic resonance are, as yet, little used by the perfume industry, according to a recent article (21). The application of some of these methods in the evaluation of bergamot oil (22) and citronella or palmarosa oils (23) is discussed in other publications. The value of these techniques in determining the structure of various perfumery materials has been stressed (24).

It is to be expected that as analytical procedures become more refined, we shall learn more about some of the trace impurities in materials used in our industry. The desirable olfactory value of these impurities is brought out in two recent studies (25) (26).

In the past, the separation of isomers was a long, tedious and often impossible task. It is now a simple routine procedure to carry out such separations, using vapor phase chromatographic techniques. Thus, mixtures of menthols and neomenthols are easily separated and the procedure can be used to separate all the isomers of menthol (27).

Various terpene hydrocarbons, previously almost impossible to separate and analyze accurately, can now be separated and studied with a high degree of accuracy by means of gas-liquid chromatography (28). The application of these procedures to the examination of essential oils very often discloses the presence of hitherto unknown ingredients. Thus, some new constituents of citrus oils (29) and thymus oil (30) were reported in recent studies.

Infrared spectrophotometry was used to determine the source of anethole. Advantage is taken of characteristic bands present in each oil containing anethole (31). Citral content can be determined in lemongrass oil in the presence of myrcene by ultraviolet absorption (32).

Liquid chromatography is often very valuable in separating large quantities of materials for examination. It can also be used as an analytical procedure. For example, it has been applied for the analysis of anise oil (33) and the separation of isoborneol from technical camphor (34).

Colorimetric methods have been developed for the determination of the essential oil in coriander seeds (35)(36).

The limitation of polarographic methods of analysis applied to coriander oil are outlined in a study (37). The value of determining the dielectric constant of essential oils to detect the presence of peroxides is outlined in another article (38).

Publication of studies employing the more recently developed methods does not mean that the older analytical methods are being discarded. On the contrary, they are still the basis of evaluation of most essential oils and synthetic materials. The acetylation method for the determination of alcohols is often complicated because of the presence of carbonyl com-

pounds. Methods have been outlined for the determination of primary alcohols in rose, geranium and citronella oils (39) and a study was published on the interference of ketones in the estimation of perfumery alcohols in synthetic mixtures (40).

The free menthol content of peppermint oil was found by reacting the oil with chloroacetyl chloride and determining the hydrogen chloride liberated, as silver chloride (41). Vanillin can be determined through its semicarbazone as outlined in a recent article (42).

Some recent advances in chemistry of interest to the perfume industry

The preparation of alpha beta unsaturated aldehydes has always presented difficulties. Syntheses directed towards the preparation of synthetic citral, with a view to its application in the manufacture of Vitamin A, have appeared in many publications in recent years.

An American patent discloses the preparation of unsaturated aldehydes by treating an allyl halide with a metal salt of nitronic acid and decomposing the resultant nitronic ester. Geranyl bromide is thus converted to citral by this method (43).

A general synthesis of alpha beta unsaturated aldehydes reported by Soviet scientists consists of the preparation of trialkoxy compounds by the interaction of acetals with vinyl ethers. These can then be converted to dienyl ethers which, in turn, are easily transformed to alpha beta unsaturated aldehydes and their acetals (44). The reaction is applicable to the synthesis of citral (45). Using citral acetal and ethoxy isoprene, the terpene chain is lengthened by five carbon atoms (46). The reaction can be controlled so that the end product is beta alkoxy aldehyde (47).

Hydroboration offers fascinating possibilities to the perfume chemist. If industrially feasible, it would give a range of perfumery materials starting from the readily available myrcene. Recently, convenient procedures were reported for the preparation of organoboranes from olefins (48). These were hydrated to alcohols by means of a 30% peroxide alkaline solution (49). When this reaction was applied to beta pinene and camphene, the resultant product was myrtanol and endo-camphanol (50).

Research in musk compounds and ambergris

A new method of synthesizing macrocyclic compounds involves the cyclization of diynes. Thus, but-4-ynyl undec-10-ynoate, on treatment with copper acetate in pyridine-ether solution gave 88% of 1,5-pentadeca-10,12-diynolide, which on hydrogenation gave 1,15-pentadecanolide (51). An identical synthesis was reported by other workers (52). The formation of such unsaturated macrocyclic compounds from omega diynes has been under investigation for some time (53).

It is indeed interesting that the synthesis of macrocyclic musk compounds has held the attention of organic chemists for so many years. On the one hand, it offers a challenge to the ingenuity of the organic chemist, and on the other, its valuable odor characteristics make it a much sought after material by the perfumer. New procedures were reported for the preparation of 15-hydroxypentadecanoic and 16-hydroxyhexadecanoic acids. Both of these materials are capable of cyclization into musk-odor compounds (54).

A synthesis of dihydrocivettone and exaltone starting from kamlolenic acid was reported (55). Civetone obtained from 1,9-cyclohexadecanedione can be purified by chromatographic absorption, according to a recent patent (56). Macrocyclic ketones were obtained from omega thienylalkane acid chlorides and gave cyclic thiophene ketones on treatment with aluminum chloride, as disclosed in a Soviet patent (57). Macrocyclic ether lactones are much easier to synthesize, but unfortunately, their odor characteristics are inferior to the pure lactones containing no ether linkage. Improved methods of preparing these ether lactones were reported in recent patents (58).

Non-macrocyclic musk compounds are generally cheaper and much progress has been made in this field in recent years. In a study of the molecular structure and its relation to the indane type musk compounds, it was reported that the non-aromatic ring can be replaced by other groups and still retain the musk odor (59). Similar intensive studies on the relation of odor and constitution of the indane series are being carried out by other workers (60). 3,5-Di-tert-butyl-1-acylbenzenes are reported to possess musk-like odors suitable for use in soaps and cosmetics (61).

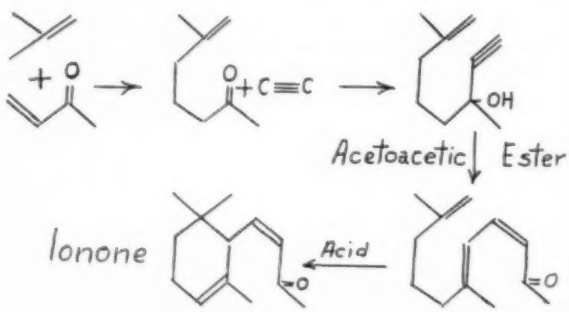
The preparation of musk-tibetene is described in a Japanese publication (62).

Gamma bicyclohomofarnesol was reported to possess an ambergris odor suitable for use in perfumes (63).

Research in ionone and irone

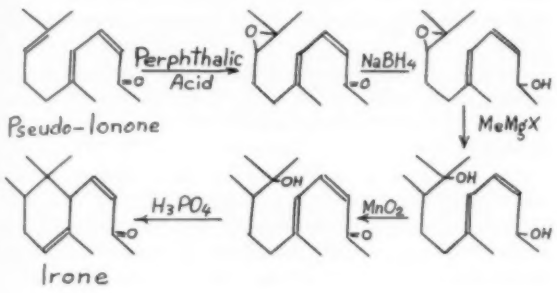
In studying the cyclization of pseudoionone, it appeared that depending upon the acid used, the intramediary products were retroionone and gamma ionone (64). In another investigation, it was found that by using pure trans-pseudoionone and mixed cis-trans pseudoionone, the same end products were obtained depending upon the condition of cyclization employed (65). According to a British patent, pseudoionone yields practically pure beta ionone when cyclization is carried out in a mixture of sulfuric acid and diisopropyl ether (66).

A German patent describes a new method of preparation of ionone, starting with isobutylene and methyl vinyl ketone, as shown in the following series of reactions (67).



It is interesting to note that the herb, *Sphaeranthus indieus*, upon steam distillation, yielded an oil which among other constituents contained alpha and possibly beta ionone (68).

A new synthesis of irone involved the placing of a methyl group in the terminal double bond (69). The reactions involved were as follows:



Benzaldehyde is one of the key raw materials used in the perfume industry. In this connection, it is interesting to note improved methods for its manufacture. An Indian patent describes the oxidation of toluene with manganese persulfate to obtain benzaldehyde (70). The study of this reaction appeared in an earlier Chinese report (71). In another Chinese study, toluene was converted to chlorobenzene, and on reacting it with potassium acetate under suitable conditions, benzyl acetate was obtained in good yields (72).

Reports on various aromatic materials

Isoeugenol has been obtained by catalytic dehydration of 1-(4-hydroxy-3-methoxyphenyl)-propanol according to a Soviet patent (73). By using a spinning band column of 28-30 theoretical plates, it was possible to separate cis- and trans-isoeugenols and their methyl ethers in pure form. The physical constants of these compounds were noted (74).

An American patent discloses that phenoxyacetaldehyde is obtained by the vapor phase oxidation of its alcohol (75). A Japanese patent describes the peroxide oxidation of p-cymene to cumenealdehyde in 30% yields (76).

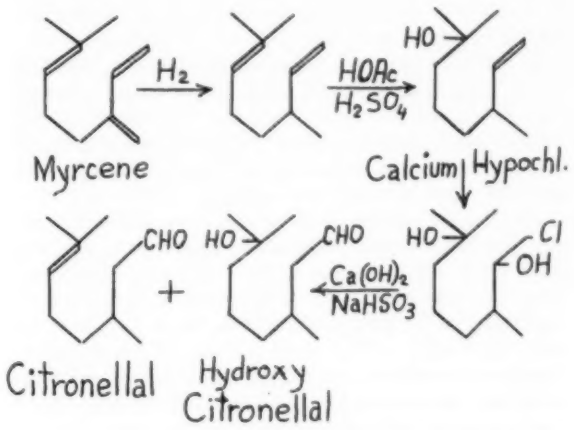
By treating alpha methyl styrene with hydrogen and carbon monoxide under suitable conditions, excellent yields of 3-phenyl butanal were obtained, according to a French patent (77). Improved conditions of the Bouveault and Blanc reduction of ethyl phenyl acetate to phenyl ethyl alcohol were described in a Polish publication (78).

Trans-anethole was chlorinated, and on treatment with potassium hydroxide, converted to dehydroanethole. The latter on hydrogenation with palladium catalyst gave pure cis-anethole (79).

Both the trans and cis 2-, 3-, and 4-hexen-1-ols in pure form were prepared by hydrogenation of the corresponding hexynols using suitable reduction procedures (80). An improved method of preparing hexenal has also been described (81).

It had been reported that condensation of mesityl oxide with methyl vinyl ketone gave on cyclization dl-piperitenone (82). This has been shown to be erroneous, the product being isoxylitone (3,5,5-trimethyl-4-isopropylidene-2-cyclohexene-1-one) (83).

A recent American patent describes the manufacture of citronellal and hydroxycitronellal starting with beta pinene (83a). The reactions involved are as follows:



Various decanols and decanones, consisting of tetrahydronaphthalene derivatives have been prepared and found to be useful in perfumes (83b). Gamma cyclohexylcrotonaldehyde has been found to possess a cuminic smell useful in perfume compositions (84). Substituted gamma lactones have also been found useful for perfumery purposes (85). According to a recent American patent, 3-methyl-1-nonyn-3-ol has a linalool like odor, and may be used in perfume compositions (86). An improved method of producing acetylenic alcohols was described in another patent (86a).

According to a recent article, about 12,000 new chemicals await evaluation from a perfumer's standpoint (87). The odor and flavor properties of various glycidates were reviewed by another writer (88).

Ethyl gamma-oxosenecioate (EtOOCCH:CMeCH-O) is reported to possess a typical watermelon odor but efforts to isolate such a substance from watermelons failed (89). A number of substituted naphthalene derivatives were found to possess good woody odors suitable for perfuming tobacco, according to an American patent (90).

Vanillin and vanilla flavor

Optimum conditions for the recovery of vanillin from lignosulfonate liquors have been investigated. The kinetics of bisulfite formation and the decomposition of the vanillin bisulfite adduct have also been studied (91). An improved synthesis of vanillin from guaiacol was reported in a Soviet publication (92). The formation of vanillin by the ozonolysis of isoeugenol was described (92a).

Substances obtained by evaporating the mother liquors from the crystallization of ethyl vanillin consisted of diethoxybenzaldehyde, 2-hydroxy-3-ethoxybenzaldehyde, 3-hydroxy-4-ethoxybenzaldehyde, and 4-hydroxy-5-ethoxybenzaldehyde (93).

In view of the great importance of true vanilla

flavor and the recent work done in an effort to devise a practical and simple means of detecting the adulteration of vanilla extracts, the two articles dealing with this problem are of great interest (94) (95).

Some interesting developments in terpene isolates

Telomerization of the hydrogen chloride addition product of isoprene gave geranyl chloride in yields of up to 21%. Some terpenyl chloride was also formed (96).

A careful study has been made of the cyclization of cis and trans geranic acid (97). Other workers carried out similar studies on the cyclization of the methyl ester of geranic acid (98). Analogs of geranyl acetone and pseudoionone have been prepared starting with non-terpenoid raw materials (99).

Various syntheses of citral and its analogs were reported in a recent publication (100). It is claimed that distillation of citral under controlled conditions gave fractions which contained isomeric mixtures of isocitral (101). Pure isocitral has been prepared by mild hydrolysis of the enol acetate of citral (102). Optimum conditions for the separation of citral from oxidized coriander oil have been investigated (103). According to a Soviet patent, linalool can be converted to citral through geranyl bromide (104). The structure of the lactone obtained from citrylidene malonic acid was subjected to a study (105). A structure has been assigned to the dilactone obtained from the addition product of citral and malonic acid (106).

Dehydration of linalool

Contrary to previously held opinions, dehydration of linalool with bisulfate gave not only myrcene but also ocimene (107). Treatment of linalool with phosphorus trichloride under controlled conditions gave 40% linalyl chloride in addition to other products (108). Dilute organic acids are shown to convert linalool and its acetate to terpineol, geraniol, nerol, etc. Steam distilled essential oils may therefore be subjected to such changes (109). Linalool labeled with C-14 has been prepared (110). The absolute configuration of lavandulol and cyclolavandulol was determined (111).

Three patents describe improved or novel methods of preparing terpineol. One involves heating alpha pinene with acetic acid and water at elevated temperatures (112); the second, the formation of terpin hydrate from pinene using sulfuric acid under controlled conditions (113); and the third describes suitable conditions for the dehydration of terpin hydrate to terpineol (114).

Thymol has been hydrogenated to isomeric menthols under varying conditions, and the product was analyzed by means of paper chromatography (115). A method of detecting dl-isomenthol present in dl-menthol has been developed, based on the differences of the solubilities of phenylurethanes of the two in hexane (116). Racemic menthol was obtained from d-pulegone found in the oil of *Mentha pulegium* (117). Another paper describes the conversion of 3-menthene into menthone (118).

Borneol has been obtained from pinene through the use of boric and chromic acid instead of the usual acetic anhydride (119). By using a series of mixtures of levo and dextro bornyl acetate, a fusion curve was obtained possessing a single eutectic point (120). The kinetics of the saponification of isobornyl acetate in the liquid phase was subjected to a study by Russian chemists (121).

A new synthesis of menthofuran has been reported (122). This interesting compound was found to undergo the diene synthesis with greater ease than furan (123). Catalytic hydrogenation of menthofuran gave not only tetrahydrofuran but also some menthol (124).

Various alcohols were obtained by reacting limonene with formaldehyde (125). The reaction products of p-8-menthene and formaldehyde were also investigated (126).

The structure of myrcenol has been shown to be most likely $Me_2C(OH)(CH_2)_3C(:CH_2)CH:CH_2$, by comparing the hydrogenated product with a synthetically prepared sample (127). Piperitols were obtained from 2,8-menthadien-1-ol, as disclosed in a recent American patent (128). Nopol and hydronopol were oxidized in the vapor phase to the corresponding aldehydes. When condensed with acetone, the aldehydes gave pleasant smelling products useful to the perfume industry (129).

One approach towards the conversion of terpene hydrocarbons to the corresponding oxygenated materials is through the epoxide. Thus, alloocimene was converted by air to the peroxide, which on hydrogenation gave hydroxycitronellol. The latter was easily converted to citronellol (130). Commercially available succinyl peroxide has been found suitable for epoxidation of terpene hydrocarbons. The conditions for the conversion of limonene to its epoxide were subjected to an investigation (131). Catalytic hydrogenation of pinene oxide using Raney nickel gave mixtures of alcohols which were not readily identifiable (132). Tertiary butyl chromate has been found to be an excellent oxidizing agent for terpenes. Among the ketones obtained from limonene were piperitone and isopiperitone (133).

On hydrogenation with Rufert Nickel catalyst, myrcene gave largely 2-methyl-6-methylene-2-octene. This and similar compounds, on treatment with acetic acid in the presence of sulfuric acid, yielded acetates useful in the perfume industry (134).

Highlights in sesquiterpene research

Remarkable advances are being made in the field of sesquiterpenes, and the structures of many of these complex substances have been elucidated.

Nerolidol, methyl nerolidol, and their oxidation products, farnesal and methyl farnesal, have been synthesized starting with geranyl chloride and acetoacetic ester (135). Some complex molecules consisting of the analogs of nerolidol, farnesyl acetone and geranyl linalool have also been prepared synthetically (136). Cis and trans nerolidol and related sesquiterpenic alcohols were prepared and their properties studied (137). According to a German patent, hexahydrofarnesol can be prepared through the Reformatzky reaction of pseudoionone with bromoacetic ester, followed by reduction of the resulting ester (138).

A number of sesquiterpenes have an azulenic structure. Of these, carotol was subjected to intensive

studies in order to determine its constitution (139) (140). Another sesquiterpene possessing an azulenic skeletal structure is ledol. Recent studies indicate that ledol is the stereoisomer of globulol (141). Recent studies on bulnesol, a sesquiterpene occurring in guaiacwood oil, showed that it too has an azulenic skeleton (142).

Costunolide, the lactone occurring in costus oil, has a different structure. The ten-membered ring lactone appears to have the structure II (143)(144) (145).

Another ten-membered ether lactone is parthenolide, isolated recently from *Chrysanthemum parthenium* (146). A related compound, aristolactone, was tentatively given a structure (147); closely related to costunolide.

A bicyclic sesquiterpene named germacrone, obtained from the oil of *Geranium macrorhizium*, is being intensively studied in order to determine its structure with certainty (148)(149). It appears to have the structure I.

Investigations to determine the absolute configuration of manool and sclareol III at carbon 13 were reported recently (150).

Numerous other reports have appeared on research involving the elucidation of the structure of sesquiterpenes, and they make fascinating reading. Various reviews, some of which are mentioned at the end of this article, periodically sum up advances in this field.

Reports on essential oils

Numerous publications have appeared dealing with the examination of essential oils obtained from new plants, or the discovery of new constituents in well known oils.

The discovery of the occurrence of acetylenic compounds in plants some years ago led to extensive investigations on this class of compounds in essential oils. In continuation of this type of work, some of the polyyne hydrocarbons found in the oil of *Artemisia vulgaris* were synthesized (151). Polyyne hydrocarbons have also been found in *Centaura ruthenica* (152) and *Aethusa cynapium* (153). Some of these were successfully synthesized. *Artemisia capillaris* contains capillin which is a benzenoid compound with an acetylenic side chain. The structure of capillin was confirmed by synthesis (154).

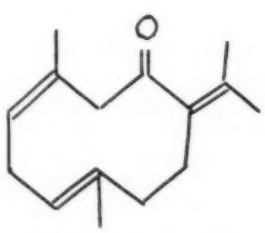
Citrus oils are always of interest, partly because large quantities are used in flavors and partly because they find extensive application in perfume compositions as light top notes. The spectroscopic behavior of forty samples of genuine bergamot oil in the ultraviolet and infrared range were reported recently (155). The production, properties and examination of cold pressed orange oils (156) and Florida Murcott honey orange oil (157) were described in two publications. The physiochemical properties of California orange and lemon oils were given by the research laboratories of the Sunkist Growers' Association (158).

It has been shown that both lavender and lavandin contain borneol and camphor but there is no bornyl acetate in either oil (159). The properties of Roumanian lavandin oil have been studied and compared with the oil produced in other countries (160). A study was made of the properties of lavender oil obtained at various stages of the efflorescence of the plant (161). A report on Italian lavender also appeared recently (161a).

Chromatographic analysis of citronella oil from Formosa revealed the presence of about one per cent linalool. This may be a natural constituent or one formed by the isomerization of geranium during distillation (162). The residue of Chinese citronella oil was examined and among other constituents, found to contain elemene and a bicyclic sesquiterpene hydrocarbon (163).

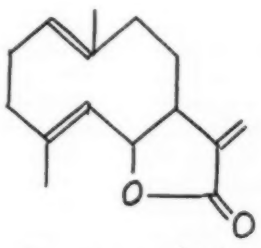
The physical and chemical properties of Michigan peppermint oil were listed, together with trace elements in the soil affecting the yield and properties of the oil (164). Some of the low boiling fractions of Japanese peppermint oils and their approximate amounts have been reported. Those identified were: acetaldehyde, acetone, methyl ethyl ketone, furfural, 1-methyl-3-cyclohexanone and methyl heptenone (165).

Examination of ylang ylang oil showed the presence of 5-6% p-tolyl methyl ether, 6-8% linalool, about 7% methyl benzoate, 20-25% benzyl acetate and 6-10% benzyl benzoate. No benzyl alcohol or linalyl acetate was found in this oil (166). Other workers reported on the ketonic fractions of vetivert oil (167). The production and properties of ylang ylang, vetivert, and geranium oil in Reunion Island were described in a recent article (168).



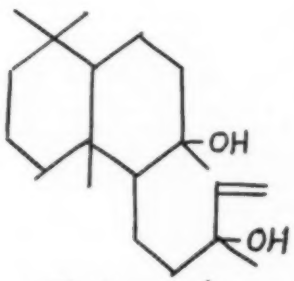
Germacrone

I



Costunolide

II



Sclareol

III

The head fractions of clary sage were found to contain 2% aldehydes consisting predominantly of nonanal along with octanal, benzaldehyde, hexanal, and possibly traces of alkyl furfural. The head fractions also contained about 3% alcohols, consisting mostly of hexanol, 3-octanol, cis-2-hexenol, and a predominance of 1-octen-3-ol (169). Another article gives the physical constants of the oils from various species of sage (170).

The oil of *pelargonium roseum* was found to have an alcohol content of 64%, calculated as geraniol (171). This oil of French origin was found to contain an azulene similar to S-azulene (172).

Reports on miscellaneous essential oils

Leptospermum citratum, an East African essential oil, was reported to have a citral content of 45% and citronellal content of 34%. The oil of *Strobilanthopsis linifolia* consisted largely of caryophyllene and its oxide (173). A new sesquiterpene, geigerinin, was isolated from *Geigeria aspera* and its structure investigated. The same substance was also isolated from *Geigeria africana* (174). Various review articles on essential oils of African origin attest to the importance of this continent as a source of essential oils. These articles discuss the production of cloves, clove leaf, and ylang ylang oils (175) as well as geranium, vetivert, lemongrass and others (176).

India has long been an important source of essential oils, and the study of essential oil bearing plants has been encouraged in recent years. New plants are being investigated and important contributions are being made in the study of the components of essential oils.

Costus roots were extracted and some of the constituents separated (177). The oil obtained from the leaves and twigs of *Zanthoxylum alatum* was examined and some of its important constituents noted (178). Similar reports were published on the essential oil of eaglewood (179) and calamus oil from Jammu and Kashmir (180). The value of vapor phase chromatography was shown in the separation of four alcohols from gingergrass oil possessing boiling points lower than perillyl alcohol (181). Two Indian essential oils obtained from *Laurus nobilis* and *E. torelliana* were reported and some of their components isolated (182). A report was made on the oil from the fruits of *Cupressus sempervirens* (183). The physical properties and the composition of a large number of essential oils of Indian origin appeared in a Belgian journal (184).

The essential oil of *Orthodon citraliferm* from Japan was found to contain 50% geranyl acetate and 30% citral (185). Two Chinese publications deal with the oil of chenopodium (186) and champaca leaf (187).

An interesting report appeared on essential oil production in the Soviet Union (188). Numerous other reports on essential oils in the Soviet Union have been published. The oil of *terrae-albae* was found to consist of over 95% camphor (189). Various Juniper species were investigated as to their essential oil content and their composition (190). The essential oil of *Artemisia serotina* from Kazakhstan was shown to contain 54% thujone, and the authors suggest that the oil may be used as basic material for the synthesis of irone (191). The oil of *Artemisia leucodes* contained more than 88% camphor (192). It is claimed that *Eucalyptus cinerea* is a valuable source of cineole, comparable to *Eucalyptus globulus* (193).

Cuminyl alcohol has been identified as a new constituent of the oil of Australian *Eucalyptus dives* (194). The essential oils of *Eucalyptus deglupta* and *E. torrelliana* were also studied (195). Various terpene hydrocarbons and alcohols were identified in the oil of New Zealand *Podocarpus spicata* (196).

The essential oil of *carqueja* from Brazil was found to contain approximately 55% carquejyl acetate (197). Carquejol is the first natural derivative with an orthomenthane skeleton encountered in essential oils (198). Other novel and interesting substances isolated from essential oils recently include beta dehydroelsholtzione, a carbonyl furanoid terpene obtained from the essential oil of *Elsholtzia oldhami* (199). The uses of this oil in perfume compositions are discussed in a recent article (200).

Using the technique of partition vapor-liquid chromatography, the composition of the essential oil of the fruit of *Litsea citrata* was determined with a greater degree of accuracy than by ordinary procedures (201). The occurrence of the active ester of 2-methyl butanol in hop oil was established by gas chromatographic technique. This is the first report of the occurrence of active amyl alcohol in an essential oil (202).

Recent reviews and books

Considerable work has been done in the field of sesquiterpenes and the advances in this phase of chemistry have been summarized in a number of reviews. One author has been reviewing the developments in terpene and sesquiterpene chemistry in a series of articles (203). A rather lengthy paper deals exclusively with recent developments in sesquiterpene chemistry (204) and another deals with the structure of sesquiterpenes, with emphasis on the ones possessing caryophyllenic, decagonal and azulenic skeletons (205).

Some Scandinavian contributions in terpene chemistry are outlined (206) and newer synthetic methods of building isoprenoid chains are reviewed (207) in two recent articles. The mechanism of acid-catalyzed cyclization of terpenoid polyenes was the subject of another publication (208).

The Essential Oil Association of the United States has revised some old standards and published new ones on the following: Oil Bitter Orange, Oil German Chamomile, Oil Cognac Green, Oil Dill Seed European, Oil Dill Seed Indian, Oil Geranium Moroccan, Oil Hops, Geranyl Formate, Oil Lavandin Ambrial, Oil Snakeroot Canadian, Oil Valerian, Alcohol C-8, Alcohol C-10, Benzyl Butyrate, Benzodihydropyrone, Laevo-Bornyl Acetate, Cedrol Recrystallized, Ethyl Caproate, Ethyl Caprylate (209).

Two Soviet books have appeared, one dealing with the manufacture of synthetics (210), and the other with the technology of the manufacture of essential oils (211).

The Schimmel Berichte remains the outstanding

annual publication on all advances of interest to our industry. The most recent one covers the year 1958 (212).

The Fritsczhe Library Bulletin is also an extremely valuable publication as it enables the reader to scan the most recent reports on perfumes and essential oils (213).

Three books, in English, French and German, are worthwhile additions to the library of those engaged in the field of perfumes or essential oils. These are: "Perfumes and Flavor Materials of Natural Origin," by Arctander (214); "Introduction a l'etude des parfums," by Bassiri (215); "International Kodex der Aetherische Ole," by Muller (216).

On the more academic side, but complete in scope, are the Annual Reports on the Progress of Chemistry, published by the London Chemical Society. The latest volume deals at some length with advances in the chemistry of terpenes (217). The same Society also publishes Reports on the Progress of Applied Chemistry, covering developments in the extraction of essential oils, applications of the newer analytical techniques, etc. (218).

This is the author's seventeenth annual review of advances in our industry (219).

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Application of Acid-Base Theory to Product Formulation

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The increased shelf-life of the products of the pharmaceutical, cosmetic and food industries has brought with it an accompanying and very important problem of stability. Although there are many facets to this problem, much of the waste of time and money could be eliminated by applying some of the basic theories of pH and buffer systems to this important, single phase of the difficulty.

Application of theory is not infallible, but it does serve to reduce the need for much of the time-consuming, trial and error methods of formulation now employed by some manufacturers. For example, many tentative proposals for alterations in formulations can be virtually eliminated by application of theory, without resorting to preparation and testing in the laboratory.

Many of the chemicals used in these types of products can be classified as weak acids and their salts, or as weak bases and their salts. These substances are usually stable only within a limited range of pH, and variation of acidity or alkalinity brings about physical and/or chemical changes. These variations in pH are most frequently caused by other ingredients in the formulation, which have their own pH, and thus alter the pH of the finished system.

Solubility of weak electrolytes

One of the problems of stability that plagues manufacturers is maintaining ingredients in solution. Weak acids and bases react with strong acids and bases and, within definite ranges of pH, exist as ions which are ordinarily soluble in water. In some cases the solubility of any undissociated acid or base is so low that precipitation will occur. The desired stability can be obtained using the pKa value and the absolute solubility of the acid or base to calculate the total solubility of the undissociated form at any given pH, as well as the pH at which precipitation should commence.

Thus, it is possible to predict incompatibilities due to faulty pH, and to make the proper adjustments in advance. This solubility and point of precipitation technique can be applied to any solvent system in which the solutes ionize, if the equilibrium constant (K) or dissociation exponent (pK) and absolute molar solubility (So) of the free acid or free base for that particular system are known or have been determined.

The solubility (S) of a salt of a weak acid may be expressed as a function of pH as shown in the following equation: (1)

$$S = So\left[1 + \frac{Ka}{(H_3O^+)}\right] \qquad (1)$$

This equation may be expressed in the more useful logarithmic form:

$$S = So\,(1 + \text{antilog pH} - pKa)$$

The pH below which the free acid separates from solution, or the pH of precipitation (pHp), is obtained by rearrangement.

$$pHp = pKa + \log\frac{S\text{-}So}{So} \qquad (2)$$

(S is the molar concentration of the salt insolution.)

An analogous equation showing the pH of precipitation of a weak base from a solution of its salt is:

$$pHp = pKw - pKb + \log\frac{So}{S\text{-}So} \qquad (3)$$

(where pKw is the ion product of water)

The pHp in this case is the point on the pH scale above which the free base will commence to precipitate.

Dissociation constants

Dissociation constants of many weak acids and bases are available from the literature, (2,3,4,) but, if these values are not reported for a substance, they can be readily determined by potentiometric methods.

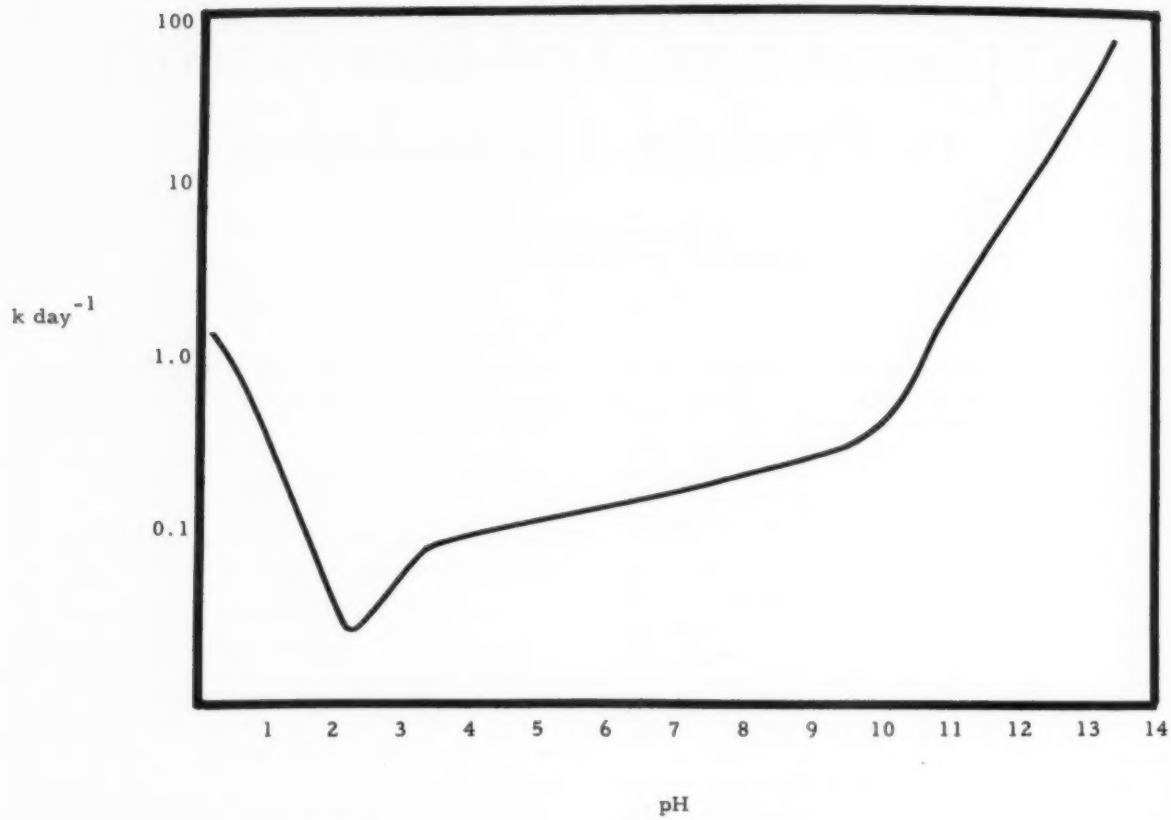
Krahl (5) determined the apparent dissociation constants of a series of substituted barbituric acids determining pK′ values at various ionic strengths and then applying a form of the Debye-Huckel equation to calculate pK values.

Parke and Davis (6) have discussed how to obtain potentiometric titration data, and they also have illustrated how such data can be interpreted to give apparent pK values.

Although the values obtained by potentiometric methods are not absolute values, they are sufficiently accurate for the purposes of formulating products. However, Harned and Owen (7) report methods to

Figure I

Relationship of Hydrolysis of Aspirin to pH



accomplish exact determinations, if they are considered to be essential.

It is advantageous in many cases to consider the effect of pH adjustments, to insure maximum stability in formulations containing substances which undergo undesirable degradation reactions. Usually the reaction rates are greatly influenced by hydrogen ion activity. It has been shown by Edwards (8) that the apparent rate constant for the hydrolysis of aspirin varies in the pH range of 1 to 14. From Fig. 1 (8), it is apparent that the most stable solution of a suspension of aspirin was obtained at a pH of approximately 2.4. Similar studies have been conducted in the cases of chloramphenicol (9), (10), procaine (11), atropine (12), tetracaine (13), epinephrine (14), prednisolone (15), homatropine and atropine methyl bromide (16), derivatives of scopolamine (17), and benzocaine (18).

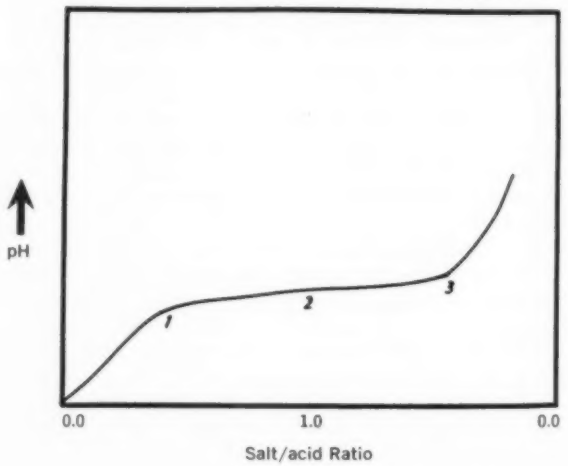
A study should be made of the effect of pH on reaction rates for the particular entity, incorporated in the formulation. The pH can then be adjusted by buffering the pH of the solution to a value where the compound exhibits the lowest rate constant.

Buffers, which are substances resisting change in pH, are frequently used to insure or maintain proper conditions of pH in a formulation. The most commonly used buffers in formulations of the type being discussed are mixtures of weak acids and their salts or mixtures of weak bases and their salts, although ampholytes (dipolar ions) are also used to some extent.

The mechanism of buffer action can best be described by referring to an illustration of a titration curve of a weak acid (Fig. 2). Point 2 is the half neutralization point in the titration, and at this point one-half of the acid has been converted to a salt

Figure 2

Titration Curve of a Weak Acid with a Strong Base



making the salt/acid ratio equal to 1. The area of the curve between points 1 and 3 is referred to as the effective buffer region, since addition of small amounts of acid or base in this region merely shifts the salt ratio without causing a great change in pH.

The buffer equation describes the effective buffer region of the titration curve mathematically:

$$pH = pKa + \log \frac{(Salt)}{(Acid)} \qquad (4)$$

It can be seen from equation (4) that pH=pKa at the half neutralization point, since the salt/acid ratio is equal to unity at that point and the log of 1 is zero. It is also apparent that the half neutralization point is the point at which buffer capacity is at a maximum.

Buffer capacity

The buffer equation is useful in qualitative consideration, but a more valuable concept from a quantitative viewpoint is that of buffer capacity or buffer efficiency.

Van Slyke (19) introduced this concept and defined buffer capacity as the ratio of the increment of strong acid or base to the small change in pH brought about by this addition. Since no sign is specified, the change is a positive one and buffer capacity is also positive. An approximate formula that can be used is

$$\beta = \frac{\Delta\ B}{\Delta\ pH} \qquad (5)$$

where B is the small increment in Gm. equiv./L. of strong base added to the buffer solution to produce a pH change of Δ pH. Therefore, the buffer capacity of a solution has a value of 1 when one Gram equivalent of base or acid results in a change of one pH unit.

Buffer capacity is dependent on the salt/acid ratio also upon the concentration of the buffer components present. The buffer capacity is greatest as the salt/acid ratio approaches unity, where pH=pKa. The buffer becomes more efficient as concentration of the buffer constituents increases, since each unit of buffer has its own buffering efficiency.

The approximate equation for buffer capacity represented merely gives the average buffer capacity over the increment of acid or base added. However, this is sufficiently practical for purposes of formulation. Van Slyke (19) developed an equation that can be used where more exact figures are desired.

$$\beta = 2.3C \left[\frac{Ka\,(H_3O^+)}{(Ka + (H_3O^+))^2} \right] \qquad (6)$$

(where C is the sum of the molar concentrations of the acid and salt)

From this equation the buffer capacity at any hydrogen ion concentration can be computed.

The application of data on buffer capacity to formulation practices can eliminate many incompatibilities. It becomes apparent from a consideration of the equation that the addition of certain ingredients could cause a shift beyond the effective buffer region of the system. It may also be used to aid in selection of a buffer for a specific product.

In selecting a buffer system several points should be observed.

1. To insure maximum buffer capacity, it is best to select a weak acid or base having a pKa value close to the pH at which the buffer is to be used.

2. The ratio of that weak acid or base and its salt required to obtain the desired pH can be determined from the buffer equation. A buffer capacity of 0.05 to 0.2 is sufficient in most work.

3. An error frequently committed is failure to check the pH and buffer capacity with a pH meter after preparation of the buffer system. The theoretical aspects serve only to guide the formulator, and should be subjected to actual verification. For example, high concentrations of electrolytes magnify the differences between calculated and experimental values markedly.

4. Proper selection of a buffer is difficult unless the solvent system has been established or data has been collected on the alternative solvent systems that may be employed. Data are available in the literature on many buffer systems that are frequently used.

5. Consider that some chemicals used as aids in formulation exhibit buffering properties in their own right. Krantz (20) investigated buffering capacities of solutions of tragacanth and acacia and illustrated that they exhibit buffering properties. Active ingredients which are frequently weak acids or bases can exhibit buffer capacity and contribute to the general picture, but this is seldom of significance.

No mention has been made of availability, cost, toxicity, etc., of buffer constituents. These problems, although important, shall not be discussed here.

The principles discussed here are invaluable if properly applied to formulation practices. In most cases, the necessary information is available or can be obtained by simple calculation. The application must be tailored to the individual problem but this is usually a simple matter. The concepts, it should be reiterated, are not magic wands, but they do serve as useful tools to decrease the time spent in the development of formulas, impractical from the onset because of the calculable incompatabilities.

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How perfumery chemicals affect insecticidal efficiency of Pyrethrum

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The inclusion of odoriferous materials in insecticidal formulae based on pyrethrum may be regarded as standard practice. For a great number of years insecticides containing pyrethrum have been sold for use in spray form and in most cases the preparrations have contained perfumes of some kind. The perfumery constituents may be of natural or synthetic origin. In more recent years the insecticides have appeared packed in pressurized containers (aerosols). The majority of these have contained pyrethrum and perfume.

However, doubt has been cast from one particular quarter on the indiscriminate use of certain aromatic chemicals commonly used for perfuming insecticides and recently comments have found their way into print. (1)

In view of the wide-spread and successful use of perfumed insecticides the statements were, to say the least of it, surprising and certainly warranted investigation.

Confining interest to pyrethrum as the active ingredient some thought was given to the manner in which perfumery chemicals might possibly inactivate this particular insecticide. In view of the accepted use of kerosene in insecticides it seems most unlikely that this type of chemical could cause trouble.

Thinking back on the phenomenon of preservative inactivation by non-ionic emulsifiers the possibility of complex formation between pyrethrum constituents and perfumery chemicals seemed a likely line of approach. On the other hand, it was also possible that the perfumery materials might in some way form complexes with the pyrethrum synergists. If complex formation between perfumery chemical and synergist did in fact occur, it is possible that the synergistic action might thereby be reduced. Unfortunately no indication has been given of the chemical or chemicals involved, or whether the reaction is immediate or occurs with time.

In view of this the biological assay of selected compounds in mixture with pyrethrins was indicated.

Biological assays are, however, time consuming and very expensive and it seemed reasonable in any investigation which might be undertaken to attempt to deal with chemicals of well defined constitution. The perfumer has at his command many hundreds of essential oils and perfumery chemicals and to test them all would be out of the question. The work to be outlined in this investigation was, therefore, restricted to the following chemicals:

A. Phenyl ethyl alcohol.
B. Phenyl ethyl acetate.
C. Geraniol.
D. Phenylacetaldehyde.
E. Phenylacetaldehyde Dimethylacetal.
F. Tetrahydrogeraniol.
G. Limonene.
H. Terpineol.
J. Terpinyl Acetate.
K. Eugenol.
L. Ionone 100%.
M. Methyl Eugenol.
N. Citral.

Although the essential oils were not included in the assays it is worth while to point out that Geraniol, Limonene, Eugenol and Citral are isolates from essential oils and that others in the list also occur naturally.

Phenyl ethyl alcohol was selected as a widely used perfumery chemical which would offer strong hydrogen-bonding properties.

The corresponding acetate was used as in this case hydrogen-bonding tendencies would be reduced when compared with the parent alcohol.

Geraniol is a typical example of an open-chain terpene alcohol much employed in perfumery.

Tetrahydrogeraniol was selected in case the double unsaturation in the geraniol molecule proved to be an important factor in any inhibition which might be found.

Phenylacetaldehyde, although not likely to be employed in a perfumed spray, is a very active chemical and appeared worthy of investigation.

The corresponding dimethyl acetal was used to demonstrate the effect of blocking the active carbonyl group in the original aldehyde.

Limonene was selected because it is so widely distributed in nature and is to be found in many of the essential oils which may be used in perfumed insecticides.

Terpineol is known for its activity in many media and is a very common ingredient of cheaper types of perfume.

The corresponding acetate was employed to demonstrate the effects of blocking the active hydroxyl radical.

Eugenol also is a very active chemical and offers great possibilities by way of hydrogen-bonding or complex formation with a second chemical.

The methyl ether was chosen to reduce this particular activity.

Finally, Citral was included as a typical perfumery constituent.

Two solutions were prepared in bulk and aliquot parts measured out to which the selected series of 13

perfumes were added at 0.5% v.v. One of these solutions was simple dilution of 25% pyrethrum extract in kerosene to give the equivalent of 0.1% pyrethrins. The second preparation was pyrethrin/piperonyl butoxide 1:8 mixture, diluted in kerosene to give the equivalent of 0.1% pyrethrins. It was not until some weeks after testing and assessment of results that the names and chemical nature of the perfumery compounds were revealed, the samples being coded by letters.

Method of testing

The simplest method of assay for comparisons of potency in this instance appeared to be that of topical application of measured micro drops of the solutions to individual flies (*Musca domestica*). An Agla micrometer syringe was used in which the area of the cross section of the barrel determines the volume of drop expelled at the nozzle per division on the micrometer gauge. In our apparatus one division on the micrometer head gave a volume of 0.2μl. A dose volume of 0.5μl (2.5 divisions) was used for each insect.

The suction method of collecting and holding the flies was employed as this obviates the possible after effects of CO_2 anaesthetisation and the psysiological disturbance due to chilling.

Preliminary tests established that suitable responses of the flies were obtained by the application of 0.5μl. of ½ and ¼ dilutions of the preparations in acetone. The standards of comparison were the unperfumed preparations. All tests were carried out within three weeks of adding the perfume to the pyrethrin solutions and again after five months' storage at ambient temperatures.

Flies were dosed in batches of 25 for each dose level and the order of testing preparations allocated for each day's work was randomized with a suitable number of tests on the "standard" included. It was found that four replicates of each test dose were necessary to give the required degree of precision, i.e. to bring the mean fiducial limits of error to about ± 15%.

The knockdown effect was the response recorded and was judged as the inability of the flies to fly or walk. Observations of this effect were made at 10, 20, 30 and 60 minutes after dosing and all four figures so obtained were used in the final assessment.

Computation of relative potency

The proportional responses p were transformed into angles θ such that $p = \sin^2\theta$ (Finney [2] Snedecor[3]. Since the observation times were the same for all four groups (viz. 10, 20, 30 and 60 minutes) the angles for each group were summed over the four observation times giving a single total for each group. The influence of the variance "between times" was thereby eliminated. It had previously been confirmed that the experimental design and procedure used was not prone to heterogeneity provided that randomization of insects was thoroughly carried out at the pupal stage or later.

As an additional precaution the order of testing of the groups was also randomized since it is possible to have restratification according to activity during the process of catching the adults, the males often preponderating initially. Restraints were imposed on the design to facilitate streamlining of the calculations. Observation times were the same throughout the series; 25 flies were dosed in each group; the ratio of high dose to low dose was fixed at 2:1. Student's "t" was taken as 1.96 and the weighting factor was 820.7 in all cases. It was found to be possible, without introducing any approximations, to complete the arithmetic needed for a 4-point test (on 25 flies per point) in about 5 minutes. The procedure was as follows:–

(a) Convert percentage responses to angles.

(b) Sum over the 4 times and enter into a 2 × 2 table as shown in the example below:–

(c) Enter in the table the sums (TH + TL) and (SH + SL), the differences (TH − TL) and (SH − SL), the difference between the sums (TH + TL) − (SH + SL) = (T − S), the sum of differences (TH − TL) + (SH − SL) = (H − L) and the difference between the differences (TH − TL) − (SH − SL) = D.
(TH = response to Test high dose, TL = response to Test low dose, SH = response to Standard high dose, SL = response to Standard low dose).

(d) Calculate the following:–

(i) log potency ration = $m = \dfrac{0.301\,(T-S)}{H-L}$, where 0.301 is the log dose ratio, i.e., log 2.

(ii) Potency ratio = R = antilog m

(iii) Slope = b = 0.415 (H − L)

(iv) Chisquared = $\dfrac{0.476\,D^2}{1{,}000}$. If chisquared exceeds 3.84 the slope of the test preparation differs significantly from that of the standard and the result would be rejected.

(v) Weight = $u = \dfrac{1.367\,(H-L)^2}{1000\left[1+\dfrac{(T-S)^2}{H-L}\right]}$

(vi) Product mu.

Example:–

	T	S	
H	204	290	
L	175	267	
Sums	379	557	→ − 178 = (T − S)
Differences	29 +	23	→ 52 = (H − L)
	29 −	23	→ 6 = D

$\dfrac{T-S}{H-L} = 3.423$ m = 1.0304

b = 21.58 R = 10.73

Chisquared = 0.017

$u = \dfrac{1.367 \times 2704}{1{,}000 \times 12.72} = 0.291$

mu = 0.2994

(e) When four or more tests are completed, calculate their combined weighted mean log potency ratio

$$\bar{m} = \frac{m_1u_1 + m_2u_2 + \ldots}{u_1 + u_2 + \ldots} = \frac{S.mu}{S.u}$$

and the log limits of error

$$m_L, m_U = \bar{m} \pm \frac{1}{\sqrt{S.u}}$$

TABLE 1

The Relative Potencies of Plain Pyrethrins and Synergized Pyrethrins in Kerosene Plus 0.5% Perfumery Compounds. Initial Tests and after 5 Months Storage.

Preparation	Unsynergized		Synergized		Mean
	Initial Test	5 months old	Initial Test	5 months old	
A	104 (88—122)	96 (88—104)	106 (96—118)	99 (90—109)	101
B	108 (91—129)	96 (88—105)	104 (94—115)	109 (98—122)	104
C	93 (83—103)	97 (84—112)	94 (85—103)	106 (93—122)	98
D	81 (72— 91)	77 (67— 84)	90 (82— 98)	78 (69— 89)	82
E	96 (83—111)	107 (94—121)	100 (90—111)	114 (103—125)	104
F	93 (83—104)	90 (79—102)	101 (90—113)	98 (89—109)	96
G	97 (86—111)	99 (88—112)	94 (85—104)	99 (88—112)	97
H	77 (62— 95)	99 (86—112)	100 (91—110)	107 (95—121)	96
J	101 (89—114)	83 (70— 97)	94 (86—103)	109 (98—122)	97
K	94 (82—108)	97 (85—110)	109 (97—123)	103 (94—114)	101
L	100 (87—116)	89 (77—103)	111 (99—124)	108 (96—121)	102
M	84 (65—109)	110 (94—128)	116 (104—130)	119 (107—134)	104
N	94 (70—127)	105 (93—120)	114 (103—126)	116 (103—129)	107

The antilogs of $\overline{m}$, m_L and m_U are ratios of potency of the test preparation to that of the standard which is taken as unity. To express them as percentages multiply by 100. The fiducial limits of error imply, here, that the probability of the true relative potency lying outside the limits is 0.05 i.e., unless a one-in-twenty chance has occurred, the true value will lie within the limits stated.

The constants in the foregoing formulae are only correct for the conditions specified; if the dose ratio, number of flies per point, number of times of observation, probability level of limits or type of transformation are changed, these constants are no longer applicable. If randomization is omitted, also, the results will be incorrect.

The relative potencies calculated as explained above are shown in Table 1, for the synergized and unsynergized mixtures initially and after 5 months storage; the figures in brackets are the fiducial limits of error. The last column in the table is the mean potency for the 2 tests and 2 retests of each compound.

In order to obtain an overall picture of the significance of the variations ascribable to differences between preparations, the use of the synergist, and the date of testing, the means of the four columns in Table 1 were arranged in a 2 × 2 table (Table 2) and the results were treated by the usual procedure for analysis of variance (Table 3).

TABLE 2

	Initial	5 months old	Mean
Unsynergized	94.0	95.8	94.9
Synergized	101.5	105.0	103.3
Mean	97.8	100.4	99.1

It is interesting to note that in the "Synergized" series the factor of synergism is higher in the presence of the perfumery compounds under consideration than in their absence. The numerical difference, however, is not very great, being measured by the increase from 94.9 to 103.3 (last column Table 2), but is considerably greater than the experimental error and is very highly significant (P = 0.1%).

The difference between occasions is not significant from which it can be deduced that, in general, the effect of perfumery compounds, if any, occurs within 2-3 weeks of admixture with the pyrethrins, there being no change over the next 4-5 months at least.

There are significant differences between preparations but the lowest value found (preparation D, last column, Table 1), was 82. It is certain that if this amount of deterioration is correctly estimated it would not be detectable in practice.

The non-significance of the variance for interaction S × O (i.e., between synergism and occasions) means that the effect of the synergist was the same on the 5-month test as on the first occasion or alternatively that the stability of the synergized preparations was paralleled by that of the unsynergized series.

Pressure pack aerosols

It has already been stated that perfumery compounds have for many years been used in spray formulations. The doubt cast on their suitability is of recent origin, since the introduction of pressurized containers. In order to test whether a debasement of pyrethrins occurs in the presence of a perfume in such a packing, comparative tests of a synergized pyrethrum with and without perfume have been carried out within two weeks of admixture and again six months later.

The basic solution used contained 1.5% pyrethrins, 10% piperonyl butoxide and 85% kerosene, 0.5% perfume (a Bouquet*) added to one half of the mixture

* (A mixture of synthetic chemicals, essential oils and isolates of essential oils.)

TABLE 3. Analysis of Variance

Item	Sum of squares	Degrees of Freedom	Variance	F	Probability
Between preparations	2023.2	12	168.6	3.242	1% > P > 0.1%
Synergist	913.9	1	913.9	17.46	< 0.1%
Occasions	88.9	1	88.9	1.699	> 20.0%
S × O Interaction	9.3	1	9.3	....	
Error	1884.4	36	52.34	....	
Total:	4919.7	51			

TABLE 4

Comparative Tests on Synergized Pyrethrins with and without perfume in Aerosol pressure cans.

Time (minutes)	Percentage Knockdown A	B
2	24.5	23.6
4	56.5	55.2
6	86.2	85.5
8	97.4	92.6
10	98.9	98.7

TABLE 5

Comparative Tests on Synerigized Pyrethrins with and without perfume in Aerosol cans six months old.

Time (minutes)	Percentage Knockdown A	B
2	29.3	19.7
10	99.2	98.6

and pressure cans filled from both mixtures separately at the rate of about 20% with 80% of propellant gases. The latter was equal weights of trichloromonofluormethane and dichlorodifluoromethane.

Bioassay technique

This was based on the technique of Goodwin-Bailey *et al.* [4]. Tests were carried out in a 1,000 ft.^{3} chamber at a constant temperature of 80°F. and R.H. 40-50%. Stratification of the atmosphere in temperature gradients was eliminated by the use of mixing fans previous to the test. Six replicate tests of the perfumed (A) and non-perfumed (B) aerosols were performed over two consecutive days using approximately 500 flies per test and randomizing the order of testing but arranging that three tests of each preparation were done on both days. The doses used were ascertained by weighing each can before and after each test and ranged from 2.38 gm. (5.01 gm. for A and 2.83—4.2 gm. for B in the preliminary tests, and 2.95—5.17 gm. for A and 3.20 gm.—5.48 gm. for B in the six-month retests.) Tables 4 and 5 respectively.

The flies were released into the aerosol cloud immediately and the knockdown rates recorded at 2, 4, 6, 8 and 10 minutes at which time the knocked-down insects were collected, counted and kept in clean recovery jars for 24 hours. There was no recovery rate. The remaining flies were also counted to arrive at the total numbers used in each test. The mean results as shown in Tables 4 and 5 were subjected to statistical analysis by the evaluation of x^2 for each time of observation.

From the inspection of the figures in Table 4 there is obviously no debasement of potency in the perfumed sample A; there is in fact a very slight superiority of A over B but which is not statistically significant. The same remarks apply also to the 6-month retest figures where however the mean dose for B was slightly higher than for A, 4.30 gm. against 4.21 gm. Nevertheless, the figures for A are superior but again not significantly so. The results in both cases are of the same order as those to be expected of a mixture of 1.5% pyrethrins with 10% piperonyl butoxide in 85% kerosene at the dose levels employed.

Discussion

The only compounds which the results suggest may have had a slightly detrimental effect on pyrethrin potency is phenylacetaldehyde (D) however, as stated earlier, this is an unlikely ingredient in aerosol formulations. Protection of the aldehyde groups by conversion to an acetal abolishes the effect but the absence of antagonism in citral (N) indicates either that an aldehyde group alone is incapable of exerting this effect, or that the conjugated double-bonding in citral or some other feature of its molecule may render the aldehyde group impotent. Other explanations are possible and more evidence would be required before any choice of alternatives could be made.

Assuming a one-to-one molecular ratio for any stoichiometric reaction between phenylacetaldehyde and pyrethrins there should (at 0.5% of the former) be more than enough of the perfumery compound to react with all the pyrethrins present (1.5%). Although 0.5% of each perfumery material has been used in the foregoing tests, it should be noted that they are not likely to occur at an amount greater than 0.05%. There is no reason to suppose that the potency drops to such a low value that the fall could be detected during normal use of the insecticidal mixture in pest control practice.

Summary

Thirteen perfumery compounds commonly used in insect control formulations containing pyrethrins have been tested biologically for antagonism to pyrethrins. Some of the compounds included were chosen because they offered the maximum opportunities for chemical and or physical association.

Samples were tested in the presence and absense of the synergist piperonyl butoxide by topical application of micro doses to normal house flies.

A "bouquet" mixture of perfumery compounds was added to a synergized pyrethrin mixture and tested in pressurized containers against free flying normal house flies in a 1,000 ^{3} chamber.

No significant debasement of the pyrethrin potency was detected among the compounds tested.

Acknowledgements

We are indebted to Mr. G. F. H. Whitney and Mrs. T. Arnold for the statistical design of the tests and the subsequent analysis and to Mrs. E. Gardner and Mrs. P. Evans for technical assistance.

We should also like to express our thanks to the Cooper Technical Bureau for the generous supply of synergized pyrethrins for pressure-can filling.

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Selling in the Sixties . . . A CHALLENGE

by HERBERT H. LANK
President, Du Pont of Canada Limited

OPPORTUNITIES AND CHALLENGES in the '60's will be many. They will be coming at us so quickly that it won't suffice any more to adopt a Newtonian attitude: We can't expect that any individual action will generate in us an equal, opposite and appropriate reaction. It will require sound and imaginative planning in all aspects of business, because our economy is moving forward at a terrific rate. Sales people particularly must appreciate that what they are really confronted with is not a static panorama but a fast-moving target. They are talking to a parade rather than to a mass meeting.

The arrival of the "Age of Plenty" and "The Affluent Society" means one thing to the sociologist but should mean quite another to the executive concerned with marketing and sales. Consumers no longer earmark the major part of their incomes for "necessities." They enjoy rising amounts of discretionary income and great freedom in how they spend it. Merchandisers, under such circumstances, can expect much switching from one industry's products to another's, and much switching from brand to brand.

The entire distributive system is changing rapidly for these reasons, but also because of tremendous sociological developments that are taking place now and, in years to come, will be accentuated. **Sales in the sixties will be affected by such developments as greater mass leisure, greater mobility of people and improved educational standards.** Our aging population will certainly affect, for example, sales of new homes and markets for refrigerators and automatic washers.

One thing we can be assured of is a rapidly changing marketplace. In our company, this change has been reflected in the fact that five of our seven plant locations are less than eight years old. Of the 12 products we manufacture at these locations, six were not produced at all in Canada 10 years ago. We have become very acclimatized to change. I won't agree that *Plus ca change, plus c'est la meme chose,* I will say that *Plus ca change, plus c'est normal.*

Let us not kid ourselves that any significant part of current social and industrial change is hollow or artificial, based merely on whimsical wants generated by those who might stand to benefit from satisfying them. A left-wing politician once asked me if I believed in "planned obsolescence."

I replied, "I most certainly did—every day our research people were trying to plan the obsolescence of our competitors and their products. Our competitors were also trying to do the same to us. If I didn't believe they were serious in planning our obsolescence, we wouldn't be in business for many more years."

Obsolescence is the very hallmark of progress, whether you do it to yourself or someone does it to you. **If you regard yourself as progressive in your industry or if you have a progressive competitor, obsolescence is inevitable—so plan for it.**

Our steady basic development, whether it be represented by entirely new materials that are cheaper or better, or new devices that get work done more easily or more quickly, is healthy, constructive and progressive. One of the most intriguing aspects of human progress is the coincidence that seems to exist between a discovery and the need which the discovery does not create but reveals.

Fast-moving change always spells opportunity for companies that are geared to capitalize on it. That will undoubtedly mean new thinking, new techniques and procedures, and new equipment. Selling has become a science, requiring training and knowledge and streamlined organization.

In planning a sound marketing approach, it is essential that what might be called "market mindedness" pervades the whole organization. As Peter Drucker emphasizes in his book, "The Practice of Management,"

> "Marketing is so basic that it is not just enough to have a strong sales department and to entrust marketing to it. Marketing is not only much broader than selling; it is not a specialized activity at all. It encompasses the entire business. It is the whole business seen from the point of view of its final result, that is, from the customer's point of view. Concern and responsibility for marketing must therefore permeate all areas of the enterprise."

Marketing—embracing product planning, marketing research, advertising, promotion, merchandising, distribution, field selling—requires just as much sound management, sound direction and sound planning as research, engineering, manufacturing, or financing. In any company that wants to get ahead these days, all management has to be sales conscious because sales begin long before the salesman sets foot inside the customer's door. Selling is a team effort, from top to bottom.

Let me illustrate. We have a plant at Sarnia making a new type of plastic called "linear" polyethylene. It is so called because its molecular structure is linear rather than branched, as conventional polyethylenes are, and it is more rigid and stronger than the con-

An address before the Canadian Manufacturers of Chemical Specialties Association, Montreal.

ventional types. Several years ago, shortly after development of the basic material in Europe and in the United States, one of our market research teams concluded that there were promising sales possibilities in Canada *if* we could develop a process suited to the particular Canadian requirements and *if* we could design an economical, small-scale, versatile production unit. Our research people went to work on it and, after three years, came up with just the process and plant we needed. Meanwhile, a sales organization was established and market development work got under way and then all of the company's services —engineering, real estate, accounting, purchasing, employee relations, advertising—all joined in one concerted effort to see that the right product at the right price got into the hands of consumers at the right time. You are now seeing this type of plastic taking over as detergent containers on supermarket shelves.

Adequate research and development work must continually support the long-term sales effort, maintaining a steady flow of useful new products and new uses for old products. The primary aim should be to get new products on the market as quickly and as economically as possible. **It is no longer good enough merely to invent and patent a new product. Its uses have to be studied, market research has to be undertaken and then development and promotion teams take over.** It may be years before the market for the newly invented product has grown to a volume to justify even a minimum-size plant. Then it is a race to consolidate your position before patents run out and direct competition develops.

Price for profit and sales

Pricing is obviously important in the over-all sales picture. Prices should be high enough to provide a fair profit but as low as possible to assure volume sales. Many other factors will affect prices, of course, over either the long or the short term. The relative value of a dissimilar product that, however, can be used for the same purpose quite often governs the price of your product. I'm sure the coal industry keeps a pretty close eye on the trends in fuel oil prices. Many prices in Canada are influenced by prices of imports from countries with low wages or low living standards. Under such conditions it is often difficult to expand profitable sales or indeed even to keep customers in business—and the trend in this respect appears to be worsening.

Also essential to unified and effective market strategy are proper organization, equipment and procedures. The organization obviously has to be geared to the particular needs of its particular product or products. It shouldn't be over-managed nor should it be sparse in imaginative and competent sales supervision. And, as we undoubtedly all know, there are optimum levels of sales staffing in the field, depending on such things as the technical nature of the product.

The degree to which an organization is to be centralized is another aspect that has to be played according to the music. Some enterprises, by their nature, require a high degree of centralization; others do not. It is true in business organization as it is in physics that the intensity of light varies inversely as the square of the distance from the source. But, on the other hand, lack of authority and responsibility in the field can seriously limit the effectiveness and the drive of the salesman.

We are all familiar with the equipment usually associated with a sales organization—the accounting machines, files, dictating machines, automobiles, etc. One of *our* best investments of recent years has been an up-to-date data processing system complete with electronic computer. It has been a tremendous aid to us in sales as well as in other aspects of our operations. Together with our teletype network joining sales offices, head office and plants, it means orders can be acknowledged, filled and invoiced far more rapidly and accurately than ever before. It means management has full, accurate *and timely* information at hand, and this aids tremendously in planning and in making decisions.

Inventory control for production

We can tell a plant manager every morning the exact inventory of each type of product he produces, whether this inventory is in his plant or in warehouses across the country. This allows him to spot a deviation from sales estimates almost as soon as that deviation starts to happen . . . and he can take the necessary steps to keep the plant on schedule or change the product mix.

This speedy action eliminates a lot of the old headaches that arose when you made too little of something: The customer began to raise Cain with the salesman and the salesman began to raise Cain with his sales management who raised Cain with the plant and then *somebody* did something. This system doesn't require a week or a month to solve the problem—it prevents it. This system also means substantial savings to the company in eliminating expensive short runs under pressure. In addition, it means maintenance down-time can be scheduled properly. It means savings in storage facilities since inventories can be kept at lower, yet adequate, levels.

Now, obviously such a system wouldn't suit all, or even many, types and sizes of businesses. But I cite it simply as an example of modern equipment and systems that can be of invaluable aid in running a business. This system, for us, has meant better customer service, more realistic inventories, and more accurate and more timely information for planning and forecasting. It all adds up to more effective operation and service to customers.

After all the plans are made, the organization established, procedures set out, equipment selected, the hard fact still remains that the salesman is the kingpin in any effort to make selling more effective. Active thought has to be given to his needs.

First of all, he has to be kept in the company picture. Today's salesman is a salaried professional, relying not on commissions for his prime satisfaction but on a longer-range sense of direction for his work. He must have a top-notch grasp of over-all company strategy, because strategy sense affects the way the salesman treats the customers.

That the company's first concern is the customer

should be obvious to anyone in a selling position, but it is not safe to assume that all salesmen know this. Active demonstration—from the top—of the importance given to marketing throughout the organization is necessary. Management has to communicate to its sales force the shape and direction of its marketing plan and the specific part which the salesman has to play.

For example, salesmen should know the "why" of their company's pricing policy. In some instances, I am sure, the pricing policies of a company are better known to its chief competitors than they are to its own sales force. He must know the simple pricing facts in order to talk intelligently to his customers. When a customer asks "why" he shouldn't be told, "I don't know" or "search me."

The salesman should also be aware of important quality values built into his product. **Many qualities that are well known to the research or the technical people won't be apparent to the customer, and it's the salesman's job to be conversant with these and how they compare with the competition.** We have found in our company that **this can be accomplished by a regular flow of information to our sales representatives about product development or technical advances on equipment;** by regular visits of sales people to the plants and by occasional job reassignments.

Salesmen have to be kept informed about what the competition is doing. Management usually has a good deal of information about the opposition and, whether it's good or bad, our man in the field should know about it. No one would think of running a professional football team without scouting the opposition and then informing the team. We shouldn't either.

Salesmen should sell

I suspect that in some organizations salesmen are asked to spend too much time on work not directly connected with sales, even though many of these activities are essential. **The important job of selling could be furthered if salesmen could spend a minimum of time on report writing, clerical work, correspondence, delivery and pick-up work, data gathering and reporting on competitors' pricing and products, and on credit work.** Then they could spend more time on sales planning, discussions with customers, merchandising assistance to dealers and sales promotion and advertising work.

Communications is a two-way street. Sales and marketing managers usually ask the salesman to become a sensitive listening post, but do they really ever listen to his reports? Do you ever seek or get your field salesmen's idea on what is hurting them, on how you could help them sell, or on how you could help solve problems facing your customers? Salesmen have a lot of good ideas that usually remain hidden. Wise management will try to cash in on them.

For example, a cheese manufacturer had excellent research, manufacturing, packaging, advertising, storage and distribution facilities but sales were increasing all too slowly. An idea campaign was launched within the company and a salesman came along with an idea which virtually doubled sales. He merely said: "Let's slice it."

Good "feedback" from the salesman on the firing line can mean new promotion ideas, vastly improved sales intelligence about the competition, a grass-roots view of how over-all sales strategy is working—and a boost in morale for the salesman who feels he is actively participating in what should be, after all, a co-ordinated effort.

Now, what about the salesman of the sixties? What resemblance will he bear to his father of the thirties or his grand-dad of the turn of the century? For one thing, he won't be operating a miniature general store. The complexity of industry and greater competition will further the trend to the sales specialist —a highly-trained, knowledgeable and persuasive ambassador of service.

Salesmen of 60's to be made

Let's face it, we won't be running into many "born" salesmen in future; they will be *made*. More and more, we find they have a solid educational grounding, technical or commercial. Then they join an organization and, especially in the larger ones, they may spend up to two or three years acquiring a thorough understanding of its production, procedures, policies, problems and people, and undergoing training in sales techniques. After all this, the salesman usually starts in a situation appropriate to his experience, perhaps in a smaller office or in a relatively sheltered spot in a larger one. As he develops and demonstrates his potential, he may be transferred to greater responsibility—or even to a sales position in a different product division entirely, to broaden his perspective and to bring a certain "cross-fertilization" to the job. His development continues on through the years.

Indeed, the person who entered sales work in the thirties was likely to have a varied and interesting career. This is something I can vouch for personally, although I entered it just a few years earlier. The salesman of the sixties, I feel sure, will find the work an even more rewarding experience.

Such a salesman will display increasingly the personal characteristics that have proven successful in the past. He will display that most important of all attitudes—"what I have to sell is a good thing for you to buy." That is putting it simply, but sitting on the buyer's side of the desk I have found it to be almost a magical sales quality; it's about half of selling. If you have that real conviction, it shows all over you. I can tell within five minutes of the time I begin talking to a man whether he has it. And if he has it, I repeat, I'm half sold.

There are other important characteristics he will have, of course. One is knowledge. The salesman of the future who doesn't know virtually all there is to know about his specific product, about its application in his customer's operations, might just as well stay home. He probably will. A prospective buyer can sense immediately whether a salesman is ad libbing or whether he has come prepared.

What about the products of the sixties—will they change? Considerably. First, there will be many new products; the rate of innovation will, if anything, increase. Then there will continue to be ever-widening

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varieties of existing products. For example, time was when anyone could have a reasonable understanding of the various plastics available. Today you have to know first whether you should use a thermoplastic or a thermosetting material. Then, depending in part on that answer, you might find it best to use a polyethylene, an acrylic, a phenolic, a styrene, a polyamide, a cellulose acetate or some other type of resin. But each of these is actually a whole family of resins and you will have to choose the particular member designed for your application. Life is *bound* to get increasingly complicated.

One of the best examples of growth and development I can think of is your own aerosol industry. From a few million units in 1946, the industry's sales have grown to the point where, in 1959, at least 575,000,000 units were packaged in the United States and Canada. More than 60 different aerosol products are now packaged in Canada. By 1965, it is quite possible that a billion aerosol units per year will be sold in the U. S. and Canada.

Selling in the Sixties, we can surely count on more of the merchandising approach that includes an important "secondary product"—customer service. This takes a variety of forms, depending on the nature of the basic product and the size of the organizations involved, but it may range from assistance in point-of-sale promotion to assistance with processing problems. We, for example, provide regular medical check-ups for our customers' employees who happen to be working with our tetraethyl lead. This, as you know, is a gasoline additive which in concentrated form is toxic; we feel we have a responsibility to the customer to undertake these check-ups.

Customer service is technical service

More commonly, customer service takes the form of technical service in helping develop, process or merchandise his product. Many companies, such as ours, have special technical laboratories available to the customer, and these often include small-scale but complete production facilities similar to his own.

There are scores of other services within the supplier firm that may be called on to back up the salesman in his approach to the customer. These include market and product research, and guidance in traffic, foreign trade or financing problems. In fact, as you probably are aware, some companies use as sales aids every area of operation in which they have particular contributions to make. If one of their customers has trouble in staffing its departments properly, the supplier firm may recommend a pattern that worked particularly well for it, or it may even loan the customer a personnel trouble shooter for a few days. Similarly for accounting, engineering, purchasing or any other department. This, to my mind, is the epitome of pervasive market mindedness and something we will be seeing more of in the sixties.

In short, regardless of our size or our product line, to sell in the sixties, we are going to need more and better salesmen, more and better products, more and better services, more and better equipment and systems. But above all, each enterprise will have to have the utmost in co-ordination, in single-mindedness and in awareness of its basic purpose—to sell.

Fragrant Flowers and Leaves

by Edward S. Maurer, F.L.S.

The *Apocynaceae* (The Dog-bane or Periwinkle Family) is an interesting, and in some ways a peculiar family, comprising herbaceous plants, shrubs and trees remarkable for the quantity of milky sap which flows readily upon the slightest injury of the leaves or stems. Such is the case for example, with the South American *Hya-hya*, or Cow-tree, which yields a sweet and wholesome milk, but in the majority of instances the latex is acrid and toxic, as is seen among the several African "Ordeal-trees". Likewise many of the trees bear apple-like edible fruits while others are extremely poisonous.

In brief, beyond the few Periwinkles native to North Europe, there are within the Order about 120 genera and upwards of 1,100 species indigenous to tropical and sub-tropical localities and most numerous in Asia. The Order of the Dog-banes includes a host of beautiful shrubby trees such as the *Allamanda*, *Echites* and *Oleander* with their peculiar fragrances, some of which have considerable potential interest to the Perfumer, but like the scentless varieties, they are mostly venomous and should be handled with care.

The generic bestowed upon this Family is derived from the Greek prefix *apo*, which may be rendered as "keep away from" and *kyon*, a dog, the plants being presumed to be fatal to dogs, whence the Anglican "Dog-bane." Amongst these, we may note the North American *A.androsaefolium*, the Spreading Dog-bane or Milkweed, the pale rose flowers of which have a fragrance suggesting a liaison between honey and new mown hay. The foliage of *A.cannabium*, the Canadian or North American Indian hemp, has a rich, balsamic resinous odor.

Prototype dogbanes

It is worthwhile quoting from an informative and color-illustrated article on the "Flower Pageant of the Mid-west," by E. S. and F. E. Clements, which appeared in the *National Geographic Magazine*, (Washington, D. C.) for August 1939. It states under the heading of the Dogbane Family that, "A red flag of warning should be waved by practically every member of this criminal family, for, concealed by attractive exteriors, handsome foliage, beautiful and sweet-scented flowers, lurks the potential poisoner."

Pink Dogbane: This attractive little plant with its descriptive common name and appallingly long scientific one, forms low borders to thickets; in British Columbia many hundreds of acres may be given over to it. Besides yielding honey of commercial value, the Pink Dogbane serves mankind with a medicinal drug from the roots, and recently the milky juice of

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Mr. Maurer's book on *Perfumes and their Production*, published in the Midsummer of 1958, within its own prescribed limits, concerns only the isolates and synthetic aromatics. In the Preface, he expressed his hope and intention of preparing a companion volume which would deal in a similar manner with the Natural products of interest to the Perfumer. This, however, is a task of great magnitude. But towards this end, since Midsummer 1955, there has appeared in our esteemed British contemporary, *Soap, Perfumery and Cosmetics*, some 45 Monographs under the heading of *Fragrance in the Natural Orders*.

Numerically, the Essential Oil texts deal with about 60 Natural Orders which embrace the Essential Oils and other products of commerce. But the comprehensive botanical texts, covering both hemispheres, detail approximately 325 Orders which house many unfamiliar wild and cultivated, temperate and tropical plants, shrubs, and trees bearing fragrant flowers and leaves (and occasionally malodorous species) of potential interest to the Perfumer.

A preliminary scrutiny of all these Families in order to locate fragrance is still a task which will occupy his leisure moments for many years. In the meantime, however, some 15 Major Natural Orders await concluding serialization. But it is thought that initial attention could be directed to a brief encyclopaedical presentation of such genera and species among the more important Minor Orders. These offer some scented proclivity, especially among the many tropical exotics. From data already logged, they appear to offer nuances of a *genre* not yet familiar to Perfumers.

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the stems has been found to contain a rather high percentage of rubber.

Vincas: Probably familiar by its presence in the hedgerows of the southern parts of Europe and North America is *Vinca minor*, the Lesser Periwinkle or Grave-yard Flower. It has conspicuous violet-blue blossoms, known in France as *Violette de Sorciers*. In passing, Chaucer repeatedly mentions it in his "Romaunt of the Rose", even making it one of the ornaments of the God of Love.

The common Latin name, *pervincula*, comes from the verb, *vincere*, meaning to bind, for its strong supple shoots had many uses in rural husbandry. This, and *Vinca major* are scentless, but several of the score or so of green-house plants (as for example, the crimson-flowered Madagascar periwinkle) have a faint clove-like odor. This fragrance, incidentally, appears more in evidence among some of the tropical dogbanes in some unexpected floral liaisons. There are also unsuspected therapeutical properties, as is the case with the South African *Vinca rosa*. This has a local reputation of being more effective than insulin. A whole chapter could be written around the strange tranquilizing alkaloids found in certain species of the genus *Rauwolfia*.

Beaumontia: Named after Mrs. M. Beaumont, a famous Victorian botanist. This is a genus indigenous to the East Indies and South America, of which, *Beaumontia grandiflora*, is variously known as the Nepaul Trumpet-flower or *Flor de Santa Anna*. It is a magnificent climbing shrub, spreading over immense space its curtain of verdant oval leaves, the trumpet-like white lilies, four inches long and three across, exhale a sweet, powerful lily-like fragrance, noticed long before the source is reached.

Melodinus: (*melon*, is the Greek for apple). *Melodinus suaveolens*—the fragrant jasmin-odored flowers are pure white, borne in large clusters at the ends of the branches. Each flower resembles a small five-bladed propeller in the center of which is a small yellow star. The dark green, glossy leaves are borne in opposite pairs, and if one is pulled off, a sticky white toxic latex exudes from the wound. In winter it bears large hard spherical orange-colored fruits, known in Hong Kong as "Coolie-apples." *Melodinus-monogynus*, is an East Indian climber with small, pure white and very fragrant blossoms which eventually form small, but edible, 'apples.' This genus is allied to the *Carissa*.

Mandevilla: (After H. J. Mandeville, a renowned French botanist), *Mandevilla suaveolens* is the well-known Chili Jasmin, a South American climbing shrub with handsome bright green leaves, completely covered with clusters of snowy-white blossoms. Each flower is about two inches across, resembling a single Petunia, the fragrance is sweeter and much stronger than that of any of the European Jasmins,—the genus *Dipladenia* offers something very similar.

Plumeria: (After M. Plumier). This is a genus of evergreen shrubs and trees incidental to the East and West Indies and particularly South America. There are some 20 species, of which, *Plumeria acuminata*, is probably best known under its soubriquet of "Spanish Jessamine." It bears large corymbs of

pure white, exquisitely jasmin-like scented blossoms. *Plumeria alba* which is similar is variously known as the Frangipanni-plant, White Nose-gay or West Indian Pagoda-plant. From several sources I gather that the fragrance inclines to a jasmin-lily type, which is also noted in the crimson flowers of *Plumeria ruba*. This is the Red Jasmin, Red Nose-gay or West Indian jasmin-mango. In passing, although we may note that the ancestral name of Marquis Frangipanni is associated with the mediaeval perfumed gloves, an alternative is suggested by the French term *franchipanier* as meaning coagulated milk because of the thick milky sap which flows so freely from the slightest injury to the leaves and branches of this species.

The genus *Amsonia* has similar properties as has *Cerbera*. The latter was named from Cerberus, the legendary three-headed dog who guarded the gates of Hades. *Cerbera Odollam* of South America, and the Madagascar *C. tanghin* (one of the several "Ordeal-trees") also exude a toxic latex on bruising. The fragrant flowers are white and borne in clusters at the ends of the branches and have a scent somewhat like that of the Madonna lilies. The fruits, which look like crab-apples, are very poisonous.

Cerbera Ahouai and *Cerbera veneifera* have red blossoms, the exuding sap on bruising is stated to be a swift antidote against snake venom, hence the local name of Brazilian Serpent's-bane. Also within this sector may be noted *Cerbera Thevetia*, variously known as the South American Oleander and *Cerbera borbonica*, the Isle of Bourbon Yellow-wood. The creamy blossoms of these are remarked as having a faint almond-like scent, while the milky proclivity of the family is again emphasized in *Cerbera lactaria*.

Trachelospermum (*Rhyncospermum*) *jasmin*: This is the Chinese or Confederate Jasmin, originally from Malaya, but now found extensively in China and Japan. It is an evergreen vine with dark, glossy green foliage, covered in early Spring with a great profusion of white, tubular pin-wheel-like blossoms which exhale towards evening a very strong, but somewhat coarse jasmin-like fragrance. The neighboring Japanese *Trachelospermum divaricatum* has orange blossoms with a similar scent.

Echites: There are upwards of 25 varieties of these evergreen climbers, chiefly indigenous to the West Indies and South America. The name in Greek signifies a viper, referring to the snake-like coils of the twining shrubs. Mostly with pink or yellow blossoms, *Echites nutans* is the spicy-scented cream-flavored Drooping Savannah-flower. *Echites caryophyllata* is a vine with bay-like leaves, which climbs to a considerable height and spreads-out quite a curtain with its numerous sprays of fragrant clove-scented star-like white blossoms.

Alstonia: (After M. Alston). From the same locality is noted *E.scholaris*, locally known as *Alstonia* fever-bark tree. No remark is made regarding any scented proclivity of the flowers but it would appear that its

Osmical Opinion

The osmical sentiments which the author expresses upon floral fragrance are personal opinions, based on a consensus as indicated in the literature cited, private overseas correspondence, conversations with nursery gardeners, florists and flower enthusiasts; supplemented by visits to the National Gardens at Kew, the private gardens of the Royal Horticultural Society and seasonable Flower Shows.

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efficacy as a febrifuge depends upon the liberal presence of methyl eugenol in the cortex. This may also be the case among the *Alstonias* proper, for *Alstonias constricta* is the Autralian Fever-bark, *Alstonias scholaris* the East Indian Devil's-tree or Dita bark-tree.

Wrightia: (After M. Wright). Belonging to the same botanical group are some half a dozen species, mostly of South American or East Indian origin, of which *W.anti-dysenterica, W.tinctoria* and *W.tomentosa,* are the Indian Darbela-flowers. These bear small white jasmin-like blossoms and are faintly redolent of this scent. Closely allied species include the genera *Adenium* (East Africa), the Mexican *Vallesias* and the North American *Amsonias.* These follow the trend evinced by *Pentalinon suberectum,* which is the "Deadly Poison Savannah-flower of Jamaica." They bear large, showy, yellow blossoms having a faint clove-like scent.

Allamandas: Fragrance and toxicity are also in evidence among the half a dozen species of the brilliant yellow-flowered Brazilian *Allamandas,* of which *Allamandas cathartica* and *Allamandas noblis* are typical. The large, trumpet shaped blossoms have a somewhat sickly odor which has been compared to a mixture of lemons and lilies.

Aganosmas: From the name in Greek, *aganes/osme,* signifying a mild scent, we should anticipate something interesting among the half-a-dozen species of these East Indian shrubby climbers. We may at once segregate *Aganosmas caryophyllata,* the pale yellow blossoms of which have a powerful clove-like scent. The white flowers of *A.acuminata, A.cymosa, A.marginata, A.Roxburghii* and *A.Wallichii,* from sundry accounts would appear to have more of a spicy cinnamon nuance.

Nerium: *N.odorum.* This is the Oriental Oleander, the East Indian Rose-bay or Rose-laurel. It is a large spreading shrub growing to about 10 feet in height and surmounted by a profusion of single or double, white, pink or crimson blossoms which impart to the air, for a considerable distance, a beautiful sweet honeyed, almond-like fragrance. It has peculiar lance-shaped leathery leaves which exude an acrid latex at the slightest touch.

Stroph/anthus: This genus may be included with the toxic *Neriums,* the Greek name signifying twisted petals, a feature of the species. There are about half a dozen yellow or red-flowered scentless species indigenous to West Africa and East Asia. These may be represented by *S.Kombe,* the Gaboon or Tropical African Arrow-poison which is of considerable commercial importance as a source of Strophanthin and Ouabain. Both are heart stimulants far more rapid and potent than anything in the Digitalis group.

Thevetia: (After M. Thevet). *Thevetia nerrifolia* from South America, so-called from its foliage which resembles that of the Oleander. It is constantly in bloom, bearing large, bright yellow, trumpet-like blossoms having a faint almond-like scent and subsequently bears an abundance of edible almonds. The genus *Pachypodium* is an allied species, of which *P.succlentum* bears white flowers and *P.tuberosum* red blossoms. They are found in abundance in Northern India and have a sweet scent.

Tabernaemontana: (After J. T. Tabernaemontanus,

a famous French savant). Among more than 20 varieties is *Tabernaemontanus coronaria*, this is the Moonbeam Flower of the East Indies. A handsome shrub growing more than 6 feet in height, it has smooth, shining, lanceolate leaves from which large double, pure enamel-white, gardenia-like blossoms peer forth. During the day they are scentless, but towards evening they emit a delicate jasmin-lily-like fragrance. *Tabernaemontana dichotoma* is similar, and is popularly known as Eve's-apple, or the Forbidden Fruit of Paradise because of the resemblance the fruit bears in size and form to a small half-eaten apple. Local tradition relates that after having been tasted by Eve, it became a deadly poison.

The yellow-flowered Cayenne *Tabernaemontana odorata*, shares with the Brailian *Tabernaemontana cannasa*, a stephanotis-like redolence, while Tabernaemontana *utilis* of British Guiana is another of the edible milk-yielding Cow-trees.

Carissa: (The Sanskrit name). This is one of the several East Indian 'Krishna-flowers,' the most familiar in that locality being *Carissa carandas*, the Corrinda-plum. It is a small tree growing up to about 15 ft. high. It bears slightly almond-scented white flowers, the ripe fruit of which, resembles a damson in shape, size and color. From it is made a highly esteemed red, currant-like preserve having a flavor not known in the Occident. The milky juice which exudes from the bruised part of the unripe fruit is manufactured locally into a kind of plastic india rubber.

Carissagrandiflora and *Arduina bispinosa*, indigenous to S. W. Africa yield two versions of the Natal Plum, which in its blossoming stage is again faintly almond-scented. *C.xylo/picron* from Mauritius, is one of the many Bitter-woods, which, like quinine have for long been used as native febrifuges.

A closely allied species namely, *Allomarkgrafia Brenesianna*, is a Mexican woody-vine bearing white spicy-scented blossoms which, when dried, are stated to retain their perfume for many months.

Ophi/oxylon: *O.serpentium* is perhaps the most interesting plant among the *Carissas*. Its double name (in Greek, *ophis* also means a serpent) alludes to the twisted snake-like roots. In India it is very common small bush, bearing compact corymbs of numerous small pure white flowers on delicate coral-red footstalks. There does not appear to be any scented proclivity. The name was bestowed by Linnaeus. It is more generally known to-day as *Rauwolfia serpentina*, after the German botanist, Leonhard Rauwolf who in 1752 published a popular account of his travels.

There are some 130 species of *Rauwolfia* indigenous to the tropics. The importance of some of these may be seen in the epitome by R. W. Richards, entitled: "Rauwolfia B.P.C. (Renewed interest in an old Indian remedy)" which appeared in the *Manufacturing Chemist* for June 1954. It is mentioned here that one of the earliest books of Hindu Medicine (1,000-800 B.C.), records its usage as an antidote against snake-bites. Also it was known in Europe about 1780 as being "invaluable for its calming and sedative effects in anxiety states," and has now taken a semi-official place in the B. P. Codex as the foremost tranquilizer of to-day. The species contain some 20 alkaloids of which the most active and important is Reserpine.

Thenardia: (After M. Thenard), *Thenardia floribunda* is a blue-flowered Mexican climber having a faint non-descript scent. The concluding genera offer several interesting items, among which is found *Vallaris pergulana*, the Malayan Trellis-shrub deriving its name from the Latin verb, *vallo*, meaning "to enclose." This climber, which flowers no less than three times a year, has a prolific lateral growth, permitting its use for this purpose, while at the same time the white cup-like blossoms diffuse a strong jasmin-like scent.

Something of the same nature is observed among the *Prestonia* (After C. Preston) for *Prestonia glabrata* is a white-flowered climber and one of the several Chinese Jessamins. *Chone/morpha*, (in the Greek means funnel-form) the white cone-flowers of the East Indian *C.macrophylla* are remarked as having a spicy redolence.

Finally we come to the genus *Aspido/sperma*, literally shielded seeds. The most important species is *A.que/bracho*, a South American tree so named from the Spanish, the prefix *que* meaning to break and *hacha*, a hatchet signifying the extreme hardness of the wood. It is known locally as Paddle-wood or Wheel-tree. This species is of commercial importance yielding valuable astringents of a type which should be of interest to Cosmetic Chemists. It also yields tannins. Of similar utility is *Schinopsis Lorentzii*, which is known as the Colardo Quebracho, the pale yellow blossoms which are reported as having a faint acacia-like scent.

In the first instance, this Order does not present any outstanding prototype scent, but collectively we have a kind of spicy pot-pourri which could be gathered from an average cottage garden. The prevalence of milky saps is worth noting because upon resinifying some of these appear to lose their toxicity, and for the Perfumer may afford pleasant or malodorous gums which quite probably possess useful fixative potentials. There is, however, one point of considerable interest; namely, the presence in quite a number of genera and species of Jasmin-like scents, these undoubtedly should prove worthy of examination.

I have from time to time in my writings visualized a cooperation between the Departments of Natural History in the Universities, the Head Gardeners of the Municipal Parks and Gardens, and progressive Nurserymen whereby small experimental plantations (or hot-house raising) could be instituted with some of the more promising genera and species. It is interesting to note that the monthly journal of the British Royal Horticultural Society offers a page of items from Fellows wishing to exchange plants at present rarely cultivated. It is therefore very gratifying to note that in the United States such an arrangement is now an actuality, largely through the efforts of Dr. C. O. Erlanson. The *Society for Economic Botany* has been established, with Dr. Ernest Guenther as the first president.

Gas liquid chromatography discussed at British meet

"The value of gas liquid chromatography to the perfumer lies in its ability to simplify studies of mixtures," D. Holness stated at the recent meeting of the Society of Cosmetic Chemists of Great Britain.

"Its value increases with increasing complexity of the mixture under examination," he said, "and when well blended mixtures are encountered, the nose does not identify all the component parts of the mixture. On the chromatogram, however, they will give characteristic peaks," he said.

Holness reported that in combination with Infrared or Mass Spectrometry, qualitative identification of components is possible, and the method is of particular value in quality control. When the chromatogram is compared with that of a standard changes in composition are clearly indicated.

In addition, Holness continued, the separation can be carried out on a preparative scale and the fractions thus isolated are subjected to further analysis by suitable methods. According to Holness, this is of great value in research where previously unidentified substances may be encountered. Also gas liquid chromatography is useful in the study of chemical reactions when the course of reaction can be followed by carrying out chromatograms at varying intervals.

Holness discussed a detailed study of analytical applications as applied to essential oils and synthetics. He said that choice of the correct column temperature is of utmost importance.

The lecturer showed a slide of a chromatogram of oil of citronella which was carried out at 100°C. Some components leave the column within three hours, whereas some components have retention times of up to 14 hours.

Many compounds containing such a variety of chemical groups were to be found in most essential oils that it is practically impossible to trace all the components in a single chromatogram.

For detailed studies, Holness reported, it was necessary to carry out a preliminary preparative scale separation and then subject the fractions so obtained to individual analytical separations under suitable conditions of temperature and stationary phase, The homogeneity of individual peaks may be checked by forming derivatives, but interference may be encountered due to other components present.

Thus, the linalol and iso-menthone of oil of geranium give one peak at 100°C. After acetylation the linalyl acetate produced gives a separate peak to that of iso-menthone. The size of the menthone peak increases due to isomerization of the iso-menthone during acetylation.

The influence of column temperature on degree of separation was clearly demonstrated. Namely, at 110°C linalol and camphor overlap on a polyethylene glycol sebacate column, but can be separated at 70°C, as can linalol and isomenthone. Borneol and linalyl acetate overlap at 70°C, but separate at 110°C.

Holness explained that quantitative analyses may be carried out by including an internal standard. The standard must be chosen so that it appears at a point on the chromatogram where the base line is free from other components. Also because some variation in detector response is experienced with different components, previous calibration is necessary.

Continuing, Holness said that intergral chromatograms facilitate measurement and give greater accuracy than determinations of peak areas.

He concluded that when the use of gas liquid chromatography is possible, then it is usually superior to present chemical methods of analysis.

NY group of SCC hear hair and fur dying similarities

Some of the techniques, formulas and modifications used in fur dying might be applicable to modern hair tinting, according to Solomon Stein, chemist and chief dyer of the Superior Fur Dying Co., Brooklyn.

Speaking before the New York chapter of the Society of Cosmetic Chemists, recently, Stein described the shades obtainable from various intermediates under different conditions of concentration, pH and combination with each other. Many of the phenols, diamines, aminophenols and naphthol intermediates are common to both industries, he said.

Unlike hair dyes, fur dyes are often used with iron and chrome mordants to alter the shade and hue, as well as to increase the fastness of the dye. However, in attempting to overcome a major problem in the fur industry (the un-natural fading of the colors in time) Stein reported that the undesirable red shade which develops can be overcome with pyrogallic acid added to the initial formula. This helps simulate the natural color fading, he said.

Hormones in dermatology

In an earlier meeting of the New York Chapter, Dr. Leonard V. Kornblee, assistant clinical professor of Dermatology at New York University reviewed some of the uses and contra indications of estrogenic, androgenic and corticosteroid hormones in dermatology.

He emphasized that estrogens have no beneficial effect on the sebaceous glands in acne. However, the corticosteroids, because of their anti-inflammatory action, have been found to be helpful.

Dr. Kornblee also said that hair growth, in certain types of alopecia, can be stimulated by injection of steroid hormones; and emphasized that topical application is ineffective in such cases. Also, oral administration, he pointed out, often leads to side effects which are reversible. Because injections have a localized action, they have many less side effects. This localization is responsible for the dramatic results often obtained with triam cinalone acetonide injections into psoriatic lesions, Dr. Kornblee concluded.

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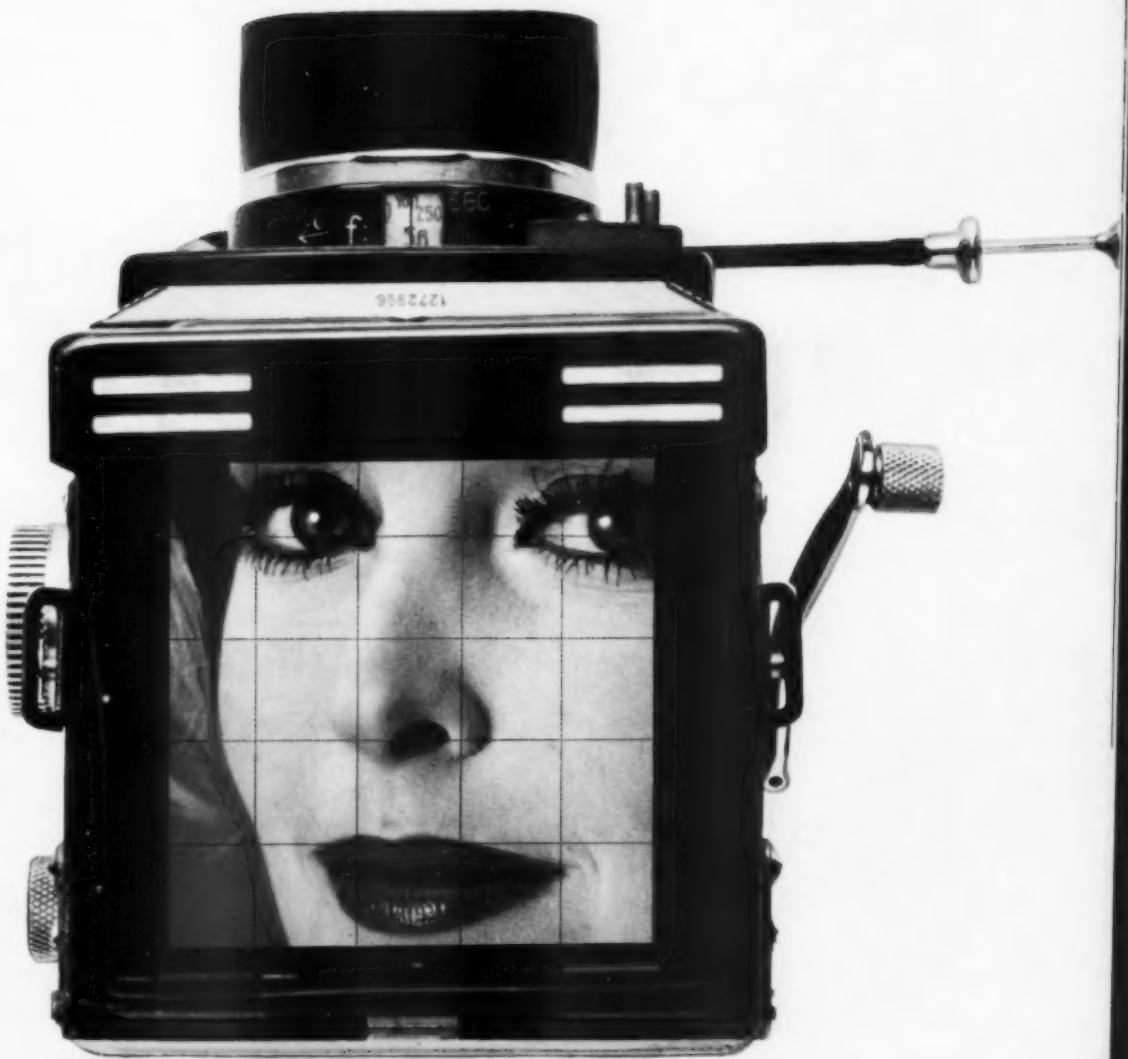

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COMPANY PROFILE

LANOLIN PLUS

BY JILL JESSEE

The "Plus" in "'Lanolin Plus" is more than *ingredient* plus. There are the plusses of vision and originality—plusses that keep a company lively and newsmaking. But even more important is the plus of drive, the plus that transforms ideas into solid over-the-counter reality.

And drive was never more concentrated in any one man that in Morton Edell, President and Personality Plus of Lanolin Plus. Soon after Mr. Edell took over in May, 1958, the company became one of the fastest growing in the cosmetic business. The whole Lanolin Plus operation generates through this presidential dynamo, whose creative genius acts as inspiration to every member of his staff.

This is nowhere more apparent than in the Lanolin Plus laboratories, creative center of the company. In spite of today's emphasis on large research staffs, many of which number in the dozens and a few even in the hundreds, Lanolin Plus performs, and performs at a high level and at top speed, with five cosmetic chemists, one in the Chicago plant and three in Newark, working under David Garlen, the director of research.

David Garlen formerly was associated with Revlon Products Corporation as senior chemist in Hair Products and also has been director of research and development for Bymart-Tintair, Inc. He is, himself, highly creative and has been responsible not only for making possible some of Mr. Edell's most revolutionary ideas, but also for dreaming up some challenging problems on his own. "Wash 'n Curl", the first protein-waving shampoo, is among his many triumphs.

Lanolin Plus started, as have so many successes in the cosmetic field, with one terrific product which proved to be the swivel on which a whole related line was to turn. This was in 1946 and the product was Lanolin Plus Liquid. What made this product unique and prophetic was that lanolin, the key ingredient, had never before been utilized to the degree nor in the manner now employed nor had it ever been so publicized.

Lanolin has been used in cosmetics since cosmetics began, but it could never before be used in more than token amounts (generally less than 5%) because it resulted in products that were too sticky, too messy, too hard to spread on the skin. Through the intensive research, Lanolin Plus Liquid proved that this seemingly hopeless problem could be overcome. Now, lanolin could be used in as high a concentration as 30% with every previous disadvantage eliminated and other advantages added such as ready skin absorption. The process was so unique that it has been patented by Lanolin Plus both in the United States and abroad.

Lanolin Plus Liquid was not only a scientific first but a psychological first. Until then, lanolin was strictly a laboratory term. The public was not aware of it. But by putting the word into the name of the product and playing up its virtues, women not only became conscious of lanolin for the first time but, too, were so convinced of its powers that lanolin has become a household word.

In addition to the initial Lanolin Plus Liquid, whose

formula recently has been improved by the addition of "Dew-O-Gen", a scientific duplication of sebum, there are Lanolin Plus All Over Body Lotion, Lanolin Plus Hand Lotion, Lanolin Plus Golden Hand Cream, Lanolin Plus Superfatted Soap, Lanolin Plus Deep Liquid Cleanser, and a number of Lanolin Plus hair preparations.

However, there are also such products whose names do not incorporate the logo, as Wash 'n Curl, in three formulae: (Regular, For Dry Hair, For Tinted or Bleached Hair) Wash 'n Tint in five shades (Blonde, Brown, Auburn, Black, Silver).

The newest item to be introduced is Color Plus, the first high fashion nail enamel to incorporate a nail strengthener.

Packaging as well as products evidence the inventiveness of Lanolin Plus executives and technicians. For instance, their recently introduced creme makeup, which is a makeup foundation, overcomes the difficulty of application from the usual style of bottle by being in a tube with a controlled application tip.

The Lanolin Plus line which reaches all levels of distribution from food stores through syndicate stores and drug stores to department stores, is for merchandising convenience divided into three categories: First, there is the basic "old line"—classic items stemming from the original Lanolin Plus Liquid. These items constitute the nucleus of the line and account for a large share of total volume. Then, there are the lower-priced, competitive items that are the impulse sellers, good value large sizes, etc. And thirdly, there are the unique items that lend themselves to special promotion such as the new Color Plus Nail Enamel, the two new additional formulas of Wash 'n Curl, and Wash 'n Tint—the color shampoo. In multiplicity and versatility, the company has come a long way from the initial single Lanolin Plus Liquid item.

There are now some 40 or 50 items in the line, and as many as ten new products were laboratory-completed during the course of last year. Out of these ten, perhaps three or four will eventually be marketed depending on many other factors in addition to their scientific approval. Final selections must be made on the basis of many marketing and merchandising factors. Lanolin Plus implements its own staff judgment of a product's desirability through the use of consumer research facilities and such resources, for instance, as *McCall's* Beauty Clinic. And even if a new product is accepted, there are the usual deterrents to its introduction of pricing, packaging, naming, aside from the necessary market area testing.

To produce as many potential items as the Lanolin Plus laboratories turn out, there is an extensive use of the best qualified outside scientific testing facilities to supplement the on-premises research staff. For example, two clinical testing laboratories are called upon to supply both performance and safety data.

Chairman of the Board Wilbur E. Dewell (left); David Garland, director of research; and Lanolin Plus President Morton Edell go over blue-print for "tomorrow's" product.

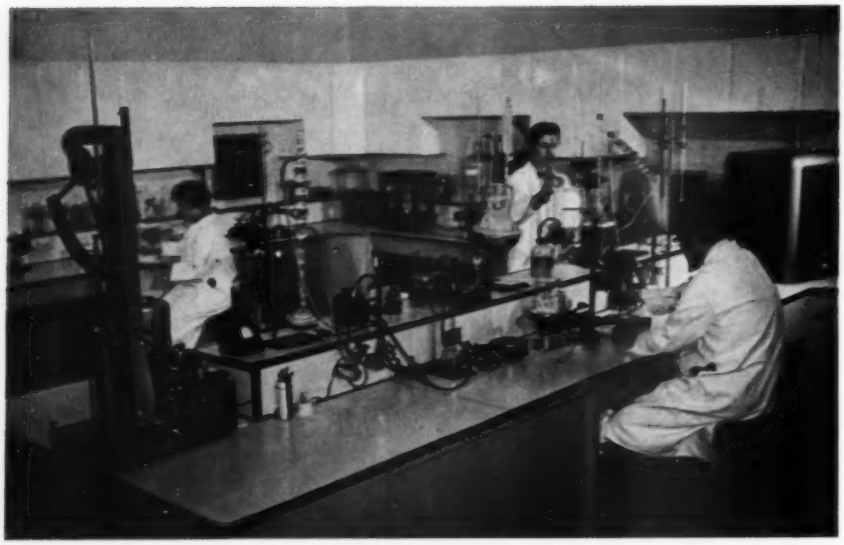
Work of cosmetic scientist and dermatologist overlap

Many problems are in the quasi-medical area where doctors specializing in vitamin and nutritional studies as well as dermatologists and nutritionists are called on. Today the dermatologist is on a common meeting ground with the cosmetic scientist, and contributes greatly to cosmetic research. After all, he wishes to do for the abnormal skin what cosmetics do for the normal skin. Consequently, he has become more and more personally involved for his own professional purposes in cosmetic research and development. There must be dermatological tests made on skin absorption and superficial absorption of certain ingredients. Patch tests must be made for skin irritation, etc. Scientific testing of ingredients for their potency against inhibiting or killing certain organisms must be made. Animals as well as human beings are used for obtaining the necessary scientific response data.

But there are many areas in which objective data is unnecessary or impossible to obtain. And as important as the instrumentation of scientific data is to product development, so much that has to do with cosmetic acceptance is subjective. Of course, the most subjective of all reactions is that to fragrance of a given product. There is no scientific measurement for pre-determining the popularity of a fragrance, either in its pure form or as a secondary factor in scenting cosmetic products. Only through adequate sampling of groups of women can a choice of fragrance be decided upon, and even then, there is no certainty of wide acceptance. This is apart, of course, from whether or not a fragrance remains stable in a certain medium, doesn't change the color of the product in question, becomes rancid, etc.

Lanolin Plus realized that a new product such as its Color Plus Nail Enamel required in-use testing to determine such things as its effectiveness in preventing splitting, cracking, and breaking of nails. There are such subjective problems as allergenic reactions which can only be determined, too, through actual use of the product. And shades of polish are a matter of personal and individual choice, and fashion news rather than analysis or chemical testing.

Mr. Garlen, Director of Research, acknowledges the



The well equipped laboratory is bright and cheerful. This environment contributes to the overall efficiency of the staff. There's plenty of work area for each researcher, which improves morale.

importance of combined objective and subjective research and utilizes thorough testing in both areas, yet feels that in cosmetics there is still another area beyond and above these which must be considered. In setting out to develop a satisfactory product which it is hoped will meet all marketing qualifications, the laboratory must have in mind a pre-determined set of goals for that product. What are the important characteristics to be achieved? These characteristics are not necessarily the assumed ones.

For instance, is the only purpose of a shampoo to cleanse the hair? If so, this is simple to accomplish. No, a shampoo must have a certain feel, it must look attractive and appealing in the bottle, it must have a pleasant fragrance, it must lather profusely, it must give a shine to the hair. Too-thorough cleansing would remove every bit of manageability and make the hair dull by removing too much of the natural oil. Certain compromises must be made to achieve the greatest number of desirable attributes. This requires not only a thorough working knowledge of raw materials (whether for a shampoo or any other cosmetic product), but also a knowledge of how to modify and adjust those raw materials to achieve the desired end result.

One phase of cosmetic research and development in which Lanolin Plus has excelled is the hair field in which it has made a number of notable contributions. These contributions are due largely to Mr. Garlen's scientific understanding and approach to hair problems. As he explained to the writer, hair, like any fibre, is subject to both physical and chemical testing. Mr. Garlen showed us a fascinating instrument in his laboratory which has been adapted from a machine used in the textile field to test the tensile strength of fibres. Hairs of different diameters are tested both before and after being treated with any given hair preparation to determine the effect of the treatment. Strength of hair is measured in relation to stretch, and the machine exerts a gradual pull until the hair breaks. Minutely detailed charts are maintained on the hair testing performed by this interesting machine.

A point of departure in product development at Lanolin Plus is how to build into one product multiple purposes. This is the Edell thinking that gives his technical staff its challenges. Why can't a cosmetic which is primarily intended to do this, also do that, is his credo. Morton Edell doesn't say, "Can it be done?" but "When can it be done?" An excellent example of this kind of thinking is Color Plus Nail Enamel, a product that not only glosses and tints the nails but has a nail strengthener incorporated to eliminate the necessity of an additional product and an additional process.

Since Mr. Edell took over the presidency of Lanolin Plus, a host of products, both single and multi-purposed, have been introduced. These include the newly-improved formula of Lanolin Plus Liquid by the inclusion of "Dew-O-Gen"; Wash 'n Tint; Wash 'n Curl; Castile Shampoo; Shampoo with Egg; Dandruff Treatment Shampoo; the new creme makeup in a tube, Complexion Control; and of course, Color Plus Nail Enamel. Just on the Lanolin Plus horizon are hairdressing in a tube and roll-on deodorant. If many of his products are multi-purposed, his aim is not. It's simply to create the finest and the most unique cosmetics possible and to market them widely and sensibly, at a price within the reach of the average consumer-budget. In this, he has been eminently successful, and the next time that volume statistics are tabulated, it is to be expected that Lanolin Plus, Inc. will be exciting proof of the validity of Mr. Edell's point of view.

All this for me?

Yes . . . this is one of the laboratories where we test new IFF fragrances "in the product" to be sure they are technically as well as aesthetically correct.

WONDERFUL WORLD OF FRAGRANCE

Service facilities, such as this Cosmetic Laboratory at IFF, New York, fully test newly-created perfumes and aromatic materials for shelf-life and compatability in all types of consumer products where fragrance is a factor.

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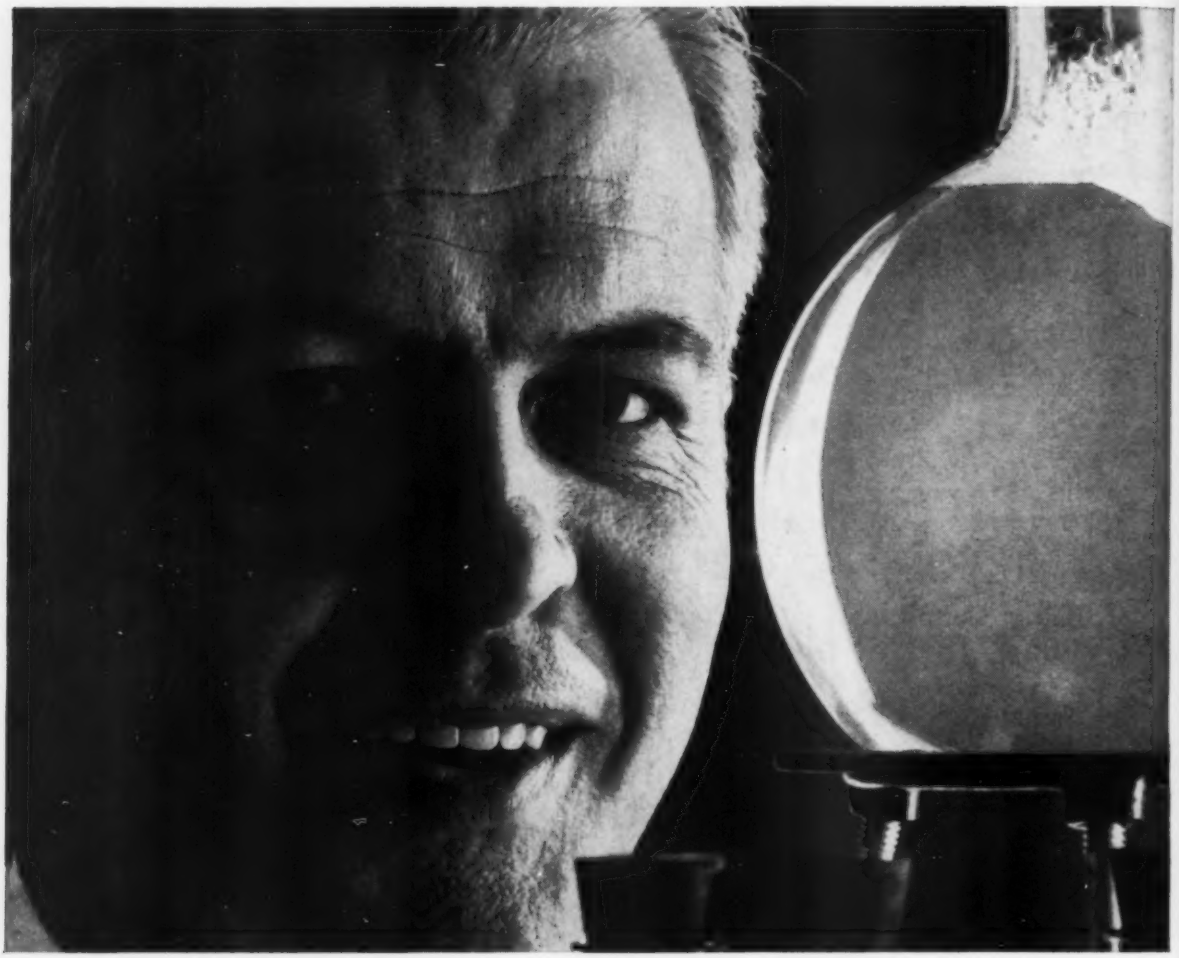

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For stick deodorants, there is CHLORACEL®, a 40% w/w solution or powder for alcoholic sticks.

Our laboratories have prepared formulations as a guide for individual manufacturers in making their own products. Write for descriptive bulletin, or about any problem.

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4223

A PERFUME OF PARTS . . . .

HERE, IN TWENTY-SIX PARTS, IS FRAGRANCE COMPOUND No. 35062 . . . .

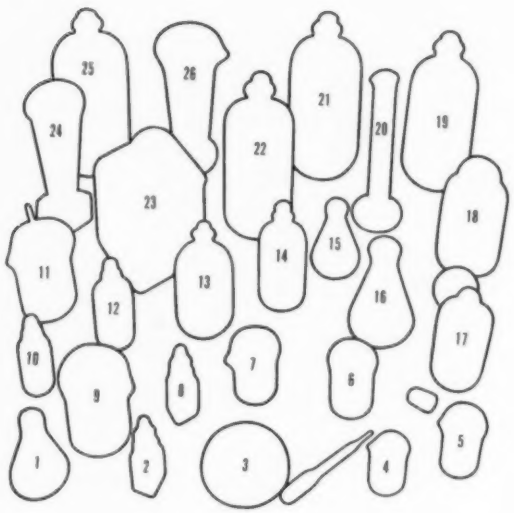
You can identify these individually by referring to the numbered diagram backing this insert. Note that the list includes aromatic chemicals, complex specialties and materials of both animal and botanical origin. Obviously, it was the artistic blending and balancing of these materials by our perfumers that made this very attractive FRITZSCHE creation possible. But behind this accomplishment lies a long record of painstaking care in the selection, manufacture and processing of all of its ingredients. In the case of those botanically derived materials, this actually extends back to their various countries of origin—sometimes halfway around the world! As we see it, this is as it should be, for as supplier, processor and guarantor of such materials, it is our responsibility to provide the best that can be made, and to do that requires complete supervision from original source to finished product. Only by this means can we solicit *your* business with confidence and assurance of satisfaction to YOU.

SEE OVER ⇨

1871... FRITZSCHE ...1961

OUR 90th AND GREATEST YEAR!

KEY TO PHOTO *(on facing page)* . . . .



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2. **OIL SAGE CLARY EXTRA**—Exclusive source of supply.
3. **COUMARIN**—Commercially available synthetic.
4. **RESINOID OLIBANUM**—Our own production; Clifton process.
5. **ABSOLUTE OF MOUSSE DE CHENE**—Exclusive source of supply.
6. **TINCTURE CIVET F.B.**—Our own production; Clifton process.
7. **VETIVER ACETATE EXTRA**—Clifton produced synthetic.
8. **RHODINOL PURE**—Isolated by Clifton process.
9. **HYDROXY-CITRONELLAL EXTRA**—Clifton produced synthetic.
10. **TINCTURE AMBERGRIS**—Our own production; exclusive source of supply.
11. **METHYL IONONE GAMMA**—Commercially available synthetic.
12. **ABSOLUTE ROSE DE MAI**—Exclusive source of supply.
13. **OIL SANDALWOOD**—Exclusive source of supply.
14. **ALDEHYDE C-14 EXTRA**—Clifton produced synthetic.
15. **AMBREINE No. 20723**—F.B. specialty.
16. **TERPINEOL ABSOLUTE**—Isolated by Clifton process.
17. **PHENYLETHYL ALCOHOL NF**—Commercially available synthetic.
18. **MUSK KETONE**—Commercially available synthetic.
19. **BENZYL ACETATE**—Commercially available synthetic.
20. **laevo—LINALOOL F.B.**—Isolated by Clifton process.
21. **iso-AMYL SALICYLATE**—Clifton produced synthetic.
22. **ISO EUGENOL**—Clifton produced synthetic.
23. **CINNAMIC ALCOHOL**—Clifton produced synthetic.
24. **LINALYL ACETATE 90/92% ESTER FROM BOIS DE ROSE**—Clifton produced synthetic.
25. **OIL BERGAMOT RECONSTITUTED F.B.**—F.B. specialty.
26. **OIL ORANGE USP CALIFORNIA COLD-PRESSED**—Exchange Brand.

ONLY AS STRONG AS ITS WEAKEST LINK....

How APT is this old saying when applied to the long chain of materials that constitutes the average perfume formulation as typified by the one detailed herewith. Off-notes or lack of purity in any one of the twenty-six items required for this composition might seriously impair the full-rounded effect as originally conceived. That is why it pays, in the long run, to use only those materials for which the supplier is willing to give unconditional guarantees of purity, uniformity and quality. FRITZSCHE has now been giving such assurances to its customers for all of *ninety years!* That is why its record in the many industries it serves continues to be one of the most enviable.

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. . NEWS AND EVENTS . . . NEWS AND

Vanderbilt buys C. E. Ising

The R. T. Vanderbilt Co., Inc., New York City, has purchased the C. E. Ising Corp., Flushing, New York manufacturer of chemicals and aromatic products. Production has been transferred to the Vanderbilt specialties department laboratories in Norwalk, Connecticut under the supervision of William Sablowsky who was Ising perfume compounder for six years.

The Ising Corp. was established in 1908 and since the death of its founder in 1943 had been operated by Mrs. Ising, who died in 1960.

TGA convenes May 9-11; Papers announced

The 26th annual convention of the Toilet Goods Association will be held from May 9 to 11 (Tuesday, Wednesday and Thursday) at the Waldorf-Astoria Hotel in New York City. The golf tournament is scheduled for May 8th at the Wingfoot Golf Club in Mamaroneck, New York. A social hour, sponsored by the TGA, is scheduled for Tuesday and The Fragrance Foundation will sponsor a dinner-dance on Wednesday.

The Scientific Section will meet on Thursday and various business programs will take place on Tuesday and Wednesday.

Papers to be presented at the Scientific Section include:

Instrumental evaluation of commercial citronellols and geraniols and their esters by James A. Rogers, Jr., director and Zolton E. Toth, research chemist, instrumental laboratories, Fritzsche Brothers, Inc.

The use of hairless mice for study of cosmetics by F. Homburger, M.D., A. Tregier, M.S., J. R. Baker, F.R.M.S. and A. B. Russfield, M.D., Ph.D., Bio-Research Consultants, Inc.

The correlation between animal tests and human tests in assessing product mildness by J. D. Justice, research manager (chemical and physical), Lever Brothers Company.

Some technical problems in the color additives field by G. Robert Clark, director, division of cosmetics, Food and Drug Administration.

The ionones and methyl ionones: a structure study via nuclear magnetic resonance by Ernst T. Theimer, Ph.D., and Seymour Lemberg, Ph.D., research laboratories, International Flavors and Fragrances, Inc.

In vitro studies on water diffusion and uptake of human skin by Peter Flesch, M.D., Ph.D., Department of Dermatology, University Hospital, University of Pennsylvania.

A study of aerosol shaving cream using statistical experimental design by Phyllis Carter and H. Mack Truax, Atlas Powder Company.

Skin respiration factor—evaluation of U.S.P. ointments by Henry Goldschmiedt, Ph.D. and Irwin I. Lubowe, M.D., Institute of Applied Biology, New York.

C.I.B.S. award to Warner-Lambert chemists

The annual Cosmetic Industry Buyers and Suppliers Association award for the most meritorious paper delivered before the Scientific Section of the Toilet Goods Association will be presented to Dr. Martin M. Rieger, director of cosmetic development, and Stanley Brechner, senior chemist, both of Warner-Lambert Pharmaceutical Co., Inc. Robert E. Ring, president of the C.I.B.S. will present the award at the Scientific Section luncheon on May 11.

Breck-sponsored TV show wins award

"Family Classics" a series of once-a-month adaptations of best-known novels produced by David Susskind for John H. Breck Inc. has been named "Best New Program Idea" in the 19th annual All-American Awards of the Year poll of critics and editors conducted by *Radio-Television Daily*.

Atlas to build new polyol plant

Atlas Powder Company will construct a new 17 million dollar plant for the production of glycerin and related polyols at the site of the company's Atlas Point chemicals plant south of Wilmington, Delaware. Construction is expected to be completed by the second quarter of 1962 and a production goal of 50 million pounds a year has been set for the new Atlas-developed process.

Rubinstein donates spectrophotometer

Helena Rubinstein, Inc., has donated an American Optical Company spectrophotometer to the Isaac Albert Research Institute of the Jewish Chronic Disease Hospital in New York. Valued at approximately $2500 the instrument will assist in a research program being undertaken at the Institute.

Factor Honors Long Service Employees

Executives of Max Factor & Co. are shown with a group of employees who have been with the company 31 years or longer. From left to right are **Theodore R. Means; Al Glassman; Max Firestein,** executive vice president; **Steve Ferentzy; Harry Mendlen; Louis Ferentzy; Nadine Thompson; Davis Factor,** chairman of the board; **Eva Friedman; Max Factor, Jr.,** president. The group was honored at a special luncheon together with a number of other employees who have completed at least twenty-five years of service to the company. Each of the honored guests received a gold service emblem set with five diamonds.

Rose Directory available

Jean Gordon, author of "Pageant of the Roses" and "Rose Recipes" has compiled a directory of rose information including gardens, nurseries, shops, books etc. A self-addressed, stamped envelope sent to Rose Museum Foundation, 244 St. George Street, Saint Augustine, Florida, with your request will bring you a free copy.

Conference asks tariff aid, fewer Federal controls

The Federal Government was asked for tariff protection and was told to lessen interference in drug industry by the Drug, Chemical & Allied Trades Association's Conferences on Business, Research and Public Welfare. Highlights of the recent meetings, held at the Waldorf-Astoria Hotel, New York City, are:

Business: despite suggestions that poor management was causing the drug and chemical cost-price squeeze, U. S. Congressman John E. Fogarty received much support for his theory that the industry needed to unite to gain tariff protection so that "cheap" labor of foreign competitors would not cause the tough business conditions existing in the drug industry today.

Research: less university and more industry research is needed although it was agreed that the two do not compete for money and people. It was thought that universities overemphasize research in order to obtain money. Fears of pressures on industry because of the amount of money provided for government programs were expressed and a physicians' trend to ask for government approved compounds was decried.

Public Welfare: the drug industry was acclaimed by Dr. George Archambault, U. S. Public Health Service, for its contribution to the welfare of mankind through its mass production of medications. *Newsweek* contributing editor, Henry Hazlett, concluded that the drug industry shouldn't have a guilt complex about profits and should be allowed high profits for research for the public welfare.

FTC issues warning on foreign origin claims

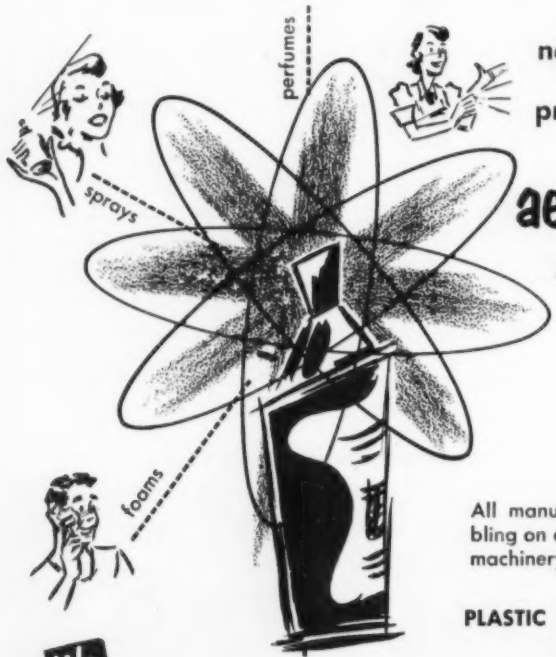
Some forty manufacturers of cosmetics and toilet goods have been warned by the Bureau of Consultation of the Federal Trade Commission to discontinue any improper claims of foreign origin for domestically-made products. If action is not voluntary the Bureau has warned that the FTC's mandatory procedures may be used to obtain compliance with the law. Under fire are advertising and labels which use words, names and phrases denoting foreign origin but do not disclose properly the domestic processing of the product. Qualified use of foreign representation is allowed only when the products actually contain ingredients from the country named or implied.

Norman Gallagher 25 years at Ungerer

Norman E. Gallagher, New York sales representative for Ungerer & Company, recently became a member of the company's Quarter-Century club. An engraved gold watch was presented to Mr. Gallagher in commemoration of his service at a luncheon held in his honor.

Kapp to sell for Process Chemicals

Benjamin Kapp has joined the sales department of Process Chemicals Co., Santa Fe Springs, Calif.



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NON-IONIC EMULSIFYING WAX

send for your FREE 1-lb. sample block

Recommended as a surfactant for quick-breaking aerosol foam preparations. Contributes to clear and colorless concentrates, soluble in alcohol, but not in water as required for this particular type of system.

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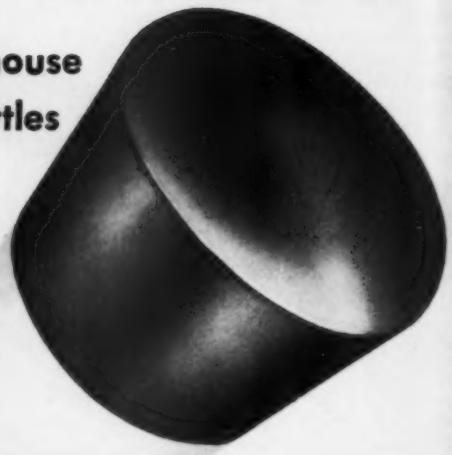
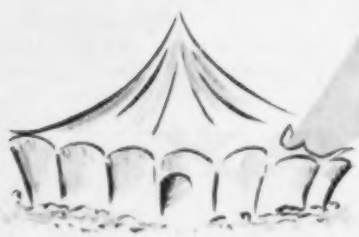
from **RICHFORD**'s magic storehouse of closures and caps for all stock bottles or your own private molds



the BIG top

Straight side flush fitting caps, size #18-415 and #20-415 to fit 2 oz. and 4 oz. stock bottles available from leading glass manufacturers.

In black phenolic, colored urea (your choice), or in the well-known Goldcôte® and Silvacôte® vacuum metalized finishes.



Your product deserves RICHFORD

and sparkling new futuras

Tapered sides, concave tops, perfect proportions identify these as "CAPS WITH A FUTURE" — made in #'s 10-425, 13-415, 15-415, 18-415, and 22-415 standard sizes, in black phenolic, colored urea (your choice), or in the well-known Goldcôte® and Silvacôte® vacuum metalized finishes.

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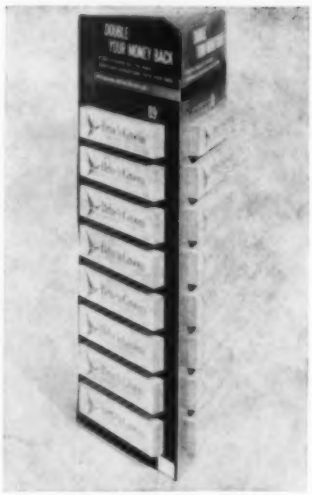
Box Designer Seymour Kent, art director of Lehn & Fink, won a **first award** for Tussy Beauty treatment. Printed in unusual colors, the copy and artwork is lively and gay. Boxmaker: Container Corporation of America, Oaks, Pa.

FOLDING CARTON WINNERS

1961 Folding Carton Competition, sponsored by
The Folding Paper Box Association of America

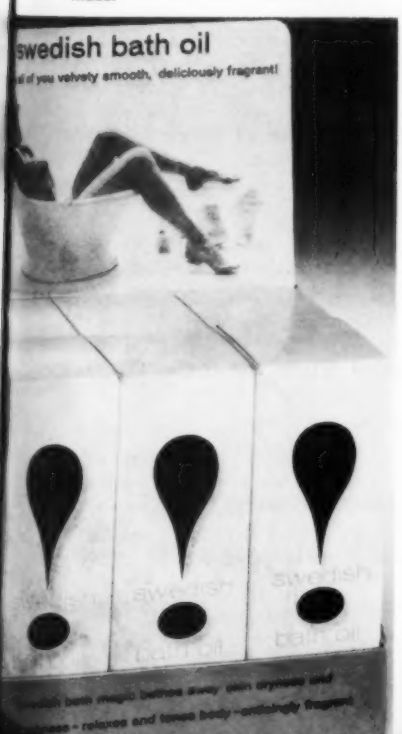
Liquid make-up dispenser display for Lanolin Plus, Inc. won **first award.** Compact unit for counter display holds make-up for six different complexions. Boxmaker: Weyerhaeuser Co., Chicago, Ill.

Four different shades of gray hair are reproduced on these cartons, which won a **merit award** for Clairol, Inc. Designed by Eric de Kolb. Boxmaker: The Warner Brothers Co., Bridgeport, Conn.



The verticality of the ladder-type counter display took a **merit award** for Rexall Drug Co., Los Angeles. It was designed in three colors by J. Chris Smith, Design Assoc. of Los Angeles. The Boxmaker: Robertson Paper Box Co., Inc., Montville, Conn.

Simplicity won **merit award** for Sybil-Ives, Ltd., Yonkers, N. Y. Mort Weiner was designer. Boxmaker: Sample-Durick Co., Inc., Chicopee, Mass.



Carton for Desert Flower Beauty Bath won **merit award** for Shulton, Clifton, N. J. Unit was printed in six colors. "Price Deal" retains dignity and high style. Boxmaker: United States Printing and Lithograph, div. of Diamond National Corp., Cincinnati.

Merit award was issued for dignified series of cartons designed by Rudy Urias of Prince Matchabelli, Inc., New York City. Large solid areas of pink are on two cartons; large green area on third. Type is in black and borders are gold leaf. Boxmaker: The Warner Brothers Co., Bridgeport, Conn.

NEW NEW NEW

PACKAGING & PROMOTION

1

1—Bourjois

Bourjois has announced a new package for their Evening in Paris bath powder. The new box has the product signature printed in deep blue against a pale version of the same shade. Bourjois seal of Paris and a decorative sprinkling of stars are the only other decorations on the package. The new $1.00 box of powder will contain five ounces instead of four and the $1.50 size will hold ten ounces.

2

2—Max Factor

Max Factor has announced plans to introduce a new product called "Finishing Powder" which is intended to be used over any foundation make-up. Three shades, beige, beige-rose, and rose-beige, will be sold for use over light, medium or dark foundations. A compact case will sell for $1.50 and a refill of the powder will be priced at $1.00. Extensive advertising in leading women's magazines and local newspapers is planned to back-up the introduction of the product during the latter part of May.

3

3—Faberge

Faberge has introduced a new gift package styled like a hat box and containing a purse size bottle of perfume, a bottle of cologne and a shaker of bath powder. The item is called "Straw Hat Cruise Kit" and will retail for $3.75.

4—Realistic Company

For professional use only is the Realistic Company's new "Spring Alive" styling spray promoted for use on

4

5

6

extra-porous, bleached, or color-treated hair. The aerosol container is decorated in lilac, blue, gold and white.

5—The Mennen Company

The Mennen Company is introducing Genteel baby bath and shampoo cleanser in drug stores and supermarkets in unbreakable polyethylene bottles. Advertising is slated to begin on May first and will include commercials on Mennen's afternoon TV properties, "Concentration" and "Young Dr. Malone" and on four other shows to be announced. Magazine advertising includes *Redbook*, *Parents'*, and *True Story*.

6—Helene Curtis

Stopette deodorant is being offered at a special 69 cent price for a spring selling drive. The special is displayed on a card with the bottle held in place by a transparent styrene blister. The red and white card has the new and old price printed on it.

7

7—Allen B. Wrisley Co.

Magnetique Spray Mist Cologne has been packaged by Allen B. Wrisley Co. in a black aerosol spray flacon with gold and white accents. The new scent is packed in a pyramid-like white, black and gold box. The two ounce package will retail for $2.00.

8—Shulton, Inc.

A full-view, candelabra-styled wire display is being used to hold Shulton's Spray Colognes as the result of a spot-check of stores during the pre-Christmas selling season. The new display unit gives the customer a full view of the sculptured glass bottle.

8

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For your cosmetic creams

DEHYDAG WAX SX

an ointment and cream base of high quality

compatible with the skin, non irritant, neutral

easily miscible with the usual vegetable, animal and mineral fats and oils

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TECHNICAL ABSTRACTS

A Note On The Solubility of Salicylic Acid in Isopropanol-Water Solution At 25°C.

By Nathan A. Hall

(digested from *American Journal of Pharmacy and the Sciences Supporting Public Health. Volume 132, No. 11,* November, 1960, p. 406-408.)

A triplicate series of test tubes containing purified isopropanol ranging from 0-100% in combination with water were used, and to each tube an excess of powdered salicylic acid was added. The tubes were secured with rubber stoppers, shaken, and set aside for three weeks at room temperature during which time they were shaken daily. The samples were placed in a constant water bath (25°C) for another two weeks and daily shaking was continued.

The solutions were titrated for salicylic acid with a standard sodium hydroxide solution. Another analysis of the samples that contained distilled water alone and 10% isopropanol was done using the Unicam Quartz Spectrophotometer at 525 millimicrons. The absorbance of the color formed upon the addition of ferric chloride was measured. The solubility of salicylic acid in aqueous isopropanol solutions at 25°C was determined and is represented in the following table:

Isopropanol % by weight	Salicylic Acid Gm./100 ml.
0	0.223
10	0.373
20	1.099
30	4.64
40	9.99
50	15.77
60	20.74
70	25.73
80	29.37
90	31.4
100	30.6

Perfume Formulas Containing Bergamot Oil By C. Mono, **Cosm. Prof. Sap. 2, 13, (1961).**

Both perfumery and pharmaceutical uses of bergamot oil are described. A soap perfume consists of the following:

	Grams
Bergamot Oil	650
a. ionone	50
Sandalwood oil	50
Geranium oil African	50
Rhodinol	100
Coumarin	30
Musk Xylol	20
Berzoin resinoid	50

Use at rate of 20 grams per kilo of soap.

A classical "cologne" fragrance is made from the following formula:

	Grams
Oil Bergamot	180
Oil Sweet Orange	50
Oil Lemon	120
Oil neroli	50
Oil petitgrain	20
Oil peppermint	2
Oil lavender	20
Oil rosemary	10
Oil Clary sage	10
Tr. Benzoin	100

Use at the rate of 20-30 grams in a liter of 85-90% alcohol.

Brit. Patent No. 840,161: Dentifrice—polishing agent comprises a-alumina and a softer material. Unilever Ltd. 14.-11.58 as 36766/58, clg. 18.11.57 (USA).

Dentifrice comprises a polishing agent mixture consisting of (a) 0.1-40% of an anhydrous a-alumina having smooth-surfaced rounded particles of an average size within the range of from 0.05-5 microns and a Moh's hardness of 9, and (b) 99.9-60% of one or more additional polishing agents having Moh's hardness of below 6. *Thru Derwent Organic Patents Bull., 198, p. 5, p. 4 (1960).*

Abstracts of Patents, Translated from German Text.

D. B. P. No. 1007,958 (1958). Royal Jelly Cosmetic.

Royal jelly is added to the usual cosmetic product during manufacture at a temperature between 30 to 35°C.

D. A. S. No. 1,021,541 (1958). Lipstick Composition.

A fatty amide is used as a lipstick coloring solvent together with a cinnamic acid ester. An example cites the following composition:

Isopropyl Myristate	15%
Oleyl Alcohol	20%
Fatty Acid Ethanolamide	10%
Benzyl Cinnamate	25%
Ozokerite	16%
Bromo Acid	4%
Pigments	10%

The melting point of this mass is 39°C.

D. B. P. No. 1,012,730 (1958). Eyebrow, Lip and Lash Coloring.

Mixtures of polyalkoxysilanes are used with carbon black or red pigments to produce eye or lip coloring. One of the examples given contains:

Phenyl Tricetylorthosilicate	35 parts
Tetro Arachidyl Orthosilicate	65 parts
Coloring matter	10.6 parts

The dropping point of this stick is 60°C.

D. A. S. No. 1,023,562 (1958). Skin Stimulant and Antimicrobial Product.

Compounds such as 4-oxy-2-oxo-benzoxythiazol 1-5%, water 30% and alcohol q.s. are used. Such compounds promote circulation and have antimicrobial properties. Their effect is quickly felt.

D. B. P. No. 968,516 (1958). Dental Prep.

A preparation of water soluble chlorophyll; a ½ to 10 per cent inclusion of a soluble salt of ortho, pyro or tripolyphosphoric acid, EDTA, citric-gluconic or citric acid; a nearly insoluble calcium compound at a pH preferably between 7.5 and 9. An example of a tooth paste consists of:

Dicalcium phosphate	50 %
Sodium Copper chlorphyllin	0.1%
Tetrosodium pyrophosphate	2.0%
CMC	1.5%
H_2O q.s.	100 %

The pH of this paste is 7.5 approximately.

D. B. P. No. 968,535 (1958). A Lip Coloring Compound.

Use is made of polysiloxanes because of (a) their stable viscosity, (b) water repellency thus preventing smudging, (c) protect skin from drying, (d) as protective films over dyes they give sheen and color brilliance. The example given contains:

Wax Alcohol	10 gm.
Cocoa Butter	10 gm.
H_2O	1 gm.
Diaryl Polysiloxane	3 gm.
Eosin	0.8 gm.
Color Pigment	2 gm.
Detergent	0.1 gm.

The ingredients are heated together, mixed until smooth and molded into sticks.

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PERSONALITIES

Dr. Hyman Henkin is now manager-product development for skin and hair products at Colgate-Palmolive Company's Research and Development Department. Dr. Henkin will work with **Dr. James W. Jenkins,** section head for skin products research, **Dr. Richard K. Lehne,** section head for hair products research and **Malcolm F. Graham,** supervisor at the research laboratories in Jersey City, New Jersey.

Philip Brass is executive vice president (a new post) of Faberge Inc., New York City. He has been with Faberge for twenty-one years in various executive positions and most recently was vice president in charge of plant management.

F. A. Degener is now director of marketing of the Heyden Chemical Division of Heyden Newport Chemical Corp., New York City. He is succeeded as general sales manager by **Walter C. Deakyne, Jr.,** who moves up from assistant general sales manager. Degener has been with Heyden since 1930 and Deakyne joined the company in 1951.

Theodore H. Risch will serve the Newport Industries division of the company as its new general sales manager. He was formerly field sales manager of the Heyden Chemical division.

Charles J. Dwyer recently joined Standard Aromatics, Inc. as vice president and director of the company's flavor division in New Jersey. Dwyer formerly headed the organoleptic department of Bristol-Myers, Inc. and before that was director of the flavor division of Dodge and Olcott, Inc.

Dr. Irwin Siegel is new deputy medical director of the Food and Drug Administration moving up from his former position of associate director of the new drug branch of the Bureau of Medicine. Dr. Siegel will help direct the staff which develops the medical policy of the FDA on safety of cosmetics, drugs and devices.

C. Bruce Brown and **Dr. Ralph Fredrickson** recently joined the special projects group at Stepan Chemical Co., Northfield, Illinois. Brown was formerly executive vice president of St. Paul Ammonia Products, Inc., St. Paul, Minnesota and Dr. Fredrickson, a chemical engineer, was with A. E. Staley Mfg. Co., Decatur, Illinois.

Dr. Carlo Giraudi is now vice president in charge of research, development and engineering from Witco Chemical Company. His responsibilities in the new post will extend to all Witco divisions and subsidiaries, including Sonneborn Chemical and Refining Corp., Ultra Chemical Works Inc., and other foreign and domestic operations.

Lewis A. Dibble, an executive of Risdon Mfg. Company, Naugatuck, Conn., for the past 47 years and its president for 33, is elected to the new post of chairman of the board and chief executive officer. The new president is **Lewis A. Dibble, Jr.** who has been with the cosmetic and aerosol producer for fifteen years, most recently as executive vice president.

Other officers elected include: **Harold W. Turnblom,** treasurer and **Roger G. Goodeve,** secretary. **Harold P. Baldwin,** former secretary-treasurer has retired but will continue as a director of Risdon. **Carroll E. Retallick** is assistant treasurer.

Theodore N. (Ted) Ruley is now president of Luzier Incorporated. The direct-selling cosmetic company is a subsidiary of Bristol-Myers.

Ruley joined the company in 1932 as an auditor and later became purchasing agent. He was named vice-president in 1946, general manager in 1950, and executive vice-president in 1956.

The Brefflich Co., New Orleans, La., is new sales representative for Werner G. Smith, Inc., Cleveland (Ohio) producer of sperm whale oil products, fatty acids, and various fat-based chemicals. **Louis Brefflich** heads the sales firm.

George R. Langlois, president of Muirson Label Co., San Jose, Calif., has been elected vice president of Lord Baltimore Press, Inc., New York City. Muirson, producer of product labels, is an affiliate of Lord Baltimore Press, designer and producer of folding cartons. Langlois will continue to headquarter at San Jose.

Fred-Henri Firmenich, grandson of Fred Firmenich, founder of Firmenich et Cie., Geneva, Switzerland, flavor and perfume producer, is spending 12 months in the States. He will visit company offices in New York,

California, Chicago, Mexico City, Toronto and Monreal.

In his tour, he will study many facets of American, Canadian and Mexican problems related to perfume and flavor.

Firmenich is a graduate of the Federal Institute of Technology at Zurich, having majored in chemistry. He is the son of Dr. Roger Firmenich.

Dr. Richard E. Farrar has been appointed to fill the newly created position of manager-research coordination for the Colgate-Palmolive Company's Household Products Division. Dr. Farrar was previously manager of the liquid products area in the Household Products Division's research department. He joined the company in 1951 as senior project chemical engineer with the Research and Development Department.

William W. Hays recently became marketing manager for Atlas Powder Company's sales department. He has been acting marketing manager for the Wilmington, Delaware firm since March, 1960.

John M. Halsted is the new vice president for purchasing at Colgate-Palmolive Company, New York City, succeeding John H. Blakney who retired after 47 years with the company.

Thomas J. Sullivan joins The Mennen Company of Morristown, New Jersey as a research chemist in the Research and Development Laboratories. He was with Fluid Chemical Company of Newark, New Jersey for three years as a product development chemist.

Dr. Richard S. Turse has joined the research department of Colgate Pharmaceutical Laboratories, div. of the Colgate-Palmolive Co.

Robert B. Honig is newly-appointed plant manager of fine chemical plant and laboratory of Tennant Development Corp., Newton, N. J. The firm, producer of organic intermediates for the cosmetic and pharmaceutical industries, is a subsidiary of C. Tennant, Sons & Co., New York City.

Harold L. Janovsky has joined Florasynth Laboratories, Inc. as technical director operating from the New York executive offices. Mr. Janovsky is a member of and chairman of the technical committees of the Flavoring Extract Manufacturers Association of the United States and the Fruit and Syrup Manufacturers Association. He is also an active member of the American Chemical Society, Institute of Food Technologists, Society of Flavor Chemists and other professional organizations. He has been in the food and flavor technology field for 27 years.

John M. Burnard has been named director of international operations for Lanolin Plus, Inc. Mr. Burnard was previously director of marketing for Miles Laboratories Pan American, Inc. and prior to that, export sales manager of the United States company of Beecham Group Ltd., England.

C. J. Gutman has been appointed sales manager of the newly created Kings Men Division of Helene Curtis Industries, Inc. Previously Kings Men products had been handled with Lentheric toiletries in a joint division known as Lentheric-Kings Men. The new division is part of the company's expansion plans.

William C. Bailey will continue as sales manager of the Lentheric Division.

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INDUSTRY EVENTS CALENDAR

April 25—Symposium, **Association of Consulting Chemists and Chemical Engineers,** Bogert Room, The Chemists' Club, 52 E. 41st St., New York City. Package Plants, a key problem in today's marketing mix to be discussed by Dr. Souren Z. Avedikian, Research Director, The Lummus Co.; and Dr. Ralph Landau, President Scientific Design Co.

May 1-3—**American Oil Chemists' Society,** 52nd Annual Meeting, Sheraton-Jefferson hotel, St. Louis.

May 9-11—**The Toilet Goods Association** (26th Annual Convention) Waldorf-Astoria hotel, New York City.

May 15-17—**Chemical Specialties Manufacturers Association** (Mid-Year Meeting) Drake Hotel, Chicago. Special Symposium on "Aerosol Insecticides—Up-to-Date" and Annual Aerosol Product Survey.

May 23—**Chicago Perfumery, Soap and Extract Association, Inc.** (Par-Busters' Golf Outing, River Forest Country Club, Elmhurst, Ill.)

June 8-10—**Manufacturing Chemists' Association, Inc.,** 89th Annual Meeting, Greebrier, White Sulphur Springs, W. Va. Key Speakers: Commerce Secretary Luther H. Hodges and Robert C. Tyson, Finance Committee Chairman U. S. Steel Corp.

June 20—**Chicago Perfumery, Soap and Extract Association** (Par-Busters' Golf Outing), Thorngate Country Club, Deerfield, Ill.

July 27—**Chicago Perfumery, Soap and Extract Association** (Par-Busters' Golf Outing), Itasca Country Club, Itasca, Ill.

Aug. 17—**Chicago Perfumery, Soap and Extract Association.** Annual "swing party" and dinner dance, Glen Flora Country Club, Homewood, Ill.

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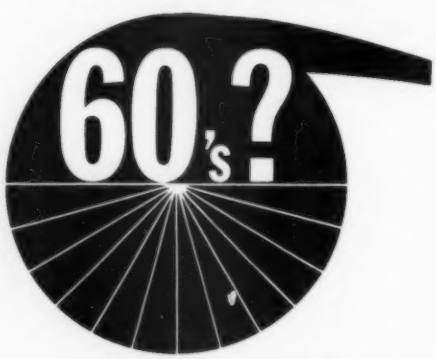

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TRADE LITERATURE

Electrical hazards discussed

• Reference for planning electrical installations in any and all hazardous locations is discussed in 60-page Bulletin #2722. Also Condulets are featured, and National Electrical Code articles 500-503, plus 510-517 are quoted. Booklet is available from Crouse-Hinds Company, Syracuse 1, N. Y.

Essential oil literature

• Fritzsche Brothers, Inc. has issued Vol. 5, No. 3 of the Fritzsche Library Bulletin, listing current literature on essential oils, isolates and aromatic chemicals. The four-page bulletin (suitable for the firm's ring binder) is available from Fritzsche Brothers, Inc., 76 Ninth Ave., New York 11, N. Y.

Colloid mills/mixers

• The Premier Mill Corp. has just issued booklet on firm's line of colloid mills and Dispersator mixers. Included is information on application of the equipment plus tabular data as an aid in selecting proper equipment for specific jobs in cosmetic production. Secure a copy from Premier Mill Corporation, Dept. 24, 224 Fifth Ave., New York City.

Bactericides-Fungicides

• Technical bulletin, "Vancides—Properties and Uses", #90, describes properties and biological activity of bactericides-fungicides used in cosmetics, soaps, etc. It is available from R. T. Vanderbilt Co., Specialties Dept., 230 Park Ave., New York City. Use and amounts of the product recommended for each application are given. Also, much of the data are presented in easy-to-read tabular form. Various products are listed along with their chemical composition, pH, solubility, toxicity, fields of use, etc.

Geigy Surfactants

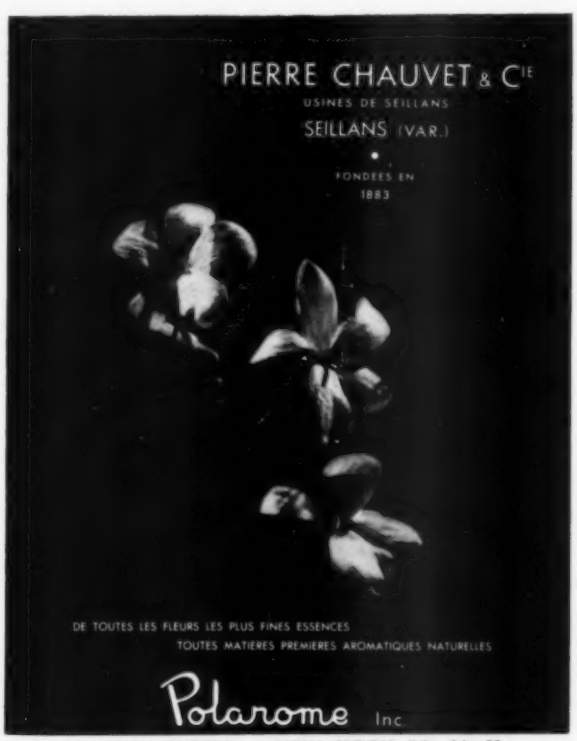
• An eight-page bulletin on surfactants is available from Geigy Industrial Chemicals, P. O. Box 430, Yonkers, New York. Information on surfactants is assembled to give the reader a picture of product structure as well as uses. New products listed in this catalog are nonylphenoxyacetic acid and lauroyl iminodiacetic acid, both carboxylic type surfactants with interesting corrosion inhibitor properties.

Sodium Benzoate

• N. V. Chemische Fabriek "Naarden", Postbus 2, Naarden, Bussum, Holland, has published a general pamphlet on sodium benzoate and benzoate acid. It discusses the use of these two products and preservatives and corrosion inhibitors, and the industrial applications of each.

Automatic filling machines

• A six-page bulletin issued by The Filler Machine Co., Inc., 10 Penn Avenue, Philadelphia, Pa., describes Geyer Piston-type Fillers for liquid, semi-liquid and semi-solid food, chemical and drug products. They feature exceptional versatility, rapid filling by bottom-up or clean cut-off, ability to handle delicate products, and quick, easy changeover and cleaning. Specifications and production capacities are shown for one-operator machines from a two-line model to a high production 12-line machine filling up to 290 containers a minute.



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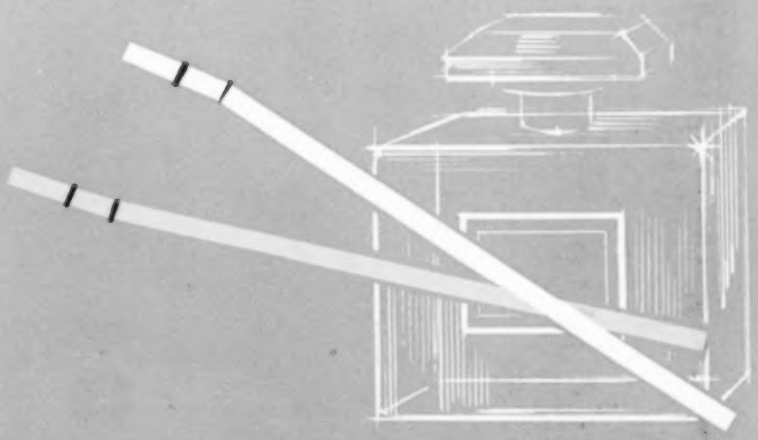

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